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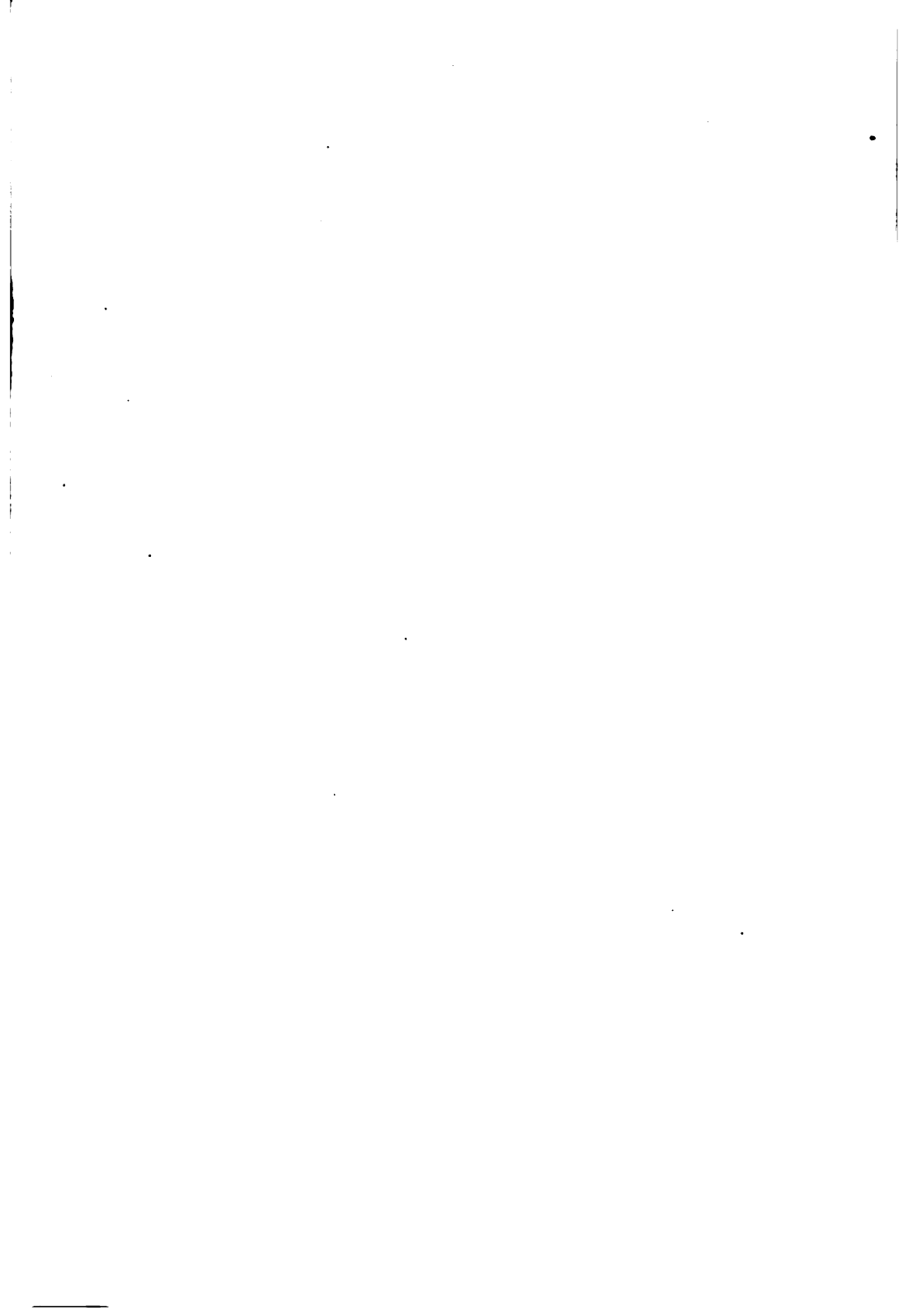
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AGRICULTURE OF VERMONT

ELEVENTH BIENNIAL REPORT

OF THE

COMMISSIONER OF AGRICULTURE

AND THE

STATE FORESTER

OF THE

STATE OF VERMONT

1920-1922

E. S. BRIGHAM, Commissioner



ST. ALBANS, VT.
ST. ALBANS MESSENGER CO. PRINT
1922

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LETTER OF TRANSMITTAL.

**OFFICE OF DEPARTMENT OF AGRICULTURE
STATE OF VERMONT.**

*To His Excellency James Hartness, Governor of
Vermont:—*

Sir:—

I have the honor to transmit herewith the report of the Commissioner of Agriculture for the two years ending June 30, 1922, together with the report of the various societies for the promotion of agriculture.

ELBERT S. BRIGHAM,
Commissioner of Agriculture.

REPORT OF THE COMMISSIONER OF AGRICULTURE.

E. S. BRIGHAM

AGRICULTURE AN IMPORTANT BUSINESS.

According to the United States census taken in 1920, Vermont agriculture is a business representing a total investment of \$222,736,620. The number of our farms was 29,075, and the average value per farm, including land, buildings, tools and live stock was \$7,661.

It is difficult to compute from the census the total earnings of our farms, because some of our crops are fed to live stock and the money income is received from live stock products sold, but making allowance for this and computing income from sources not enumerated in the census, we believe that the value of all commodities produced by our farms, including wood and lumber, was \$56,000,000. in 1919, or \$1,926 per farm.

The state department of agriculture is an agency set up by the state to carry on, as the laws provide, certain activities for the conservation, protection and development of the agricultural industry. I will report in detail what has been done during the biennial period with funds appropriated by the legislature to carry on these activities, give an account of the work carried on, and make certain recommendations relating thereto.

SUPPRESSION OF INJURIOUS INSECTS AND FUNGUS DISEASES.

During the biennial period an invasion of the gypsy moth on the eastern border of the state has given the department greatest concern. During the war the funds appropriated by the federal government did not enable the bureau of entomology of the U. S. Department of Agriculture to do the usual amount of scouting, because of the higher cost of labor and the result was a greater spread of this insect. An infestation has now been found in about sixty towns in the eastern and southern parts of the state. This infestation is as yet light but unless measures are taken to keep it under control its spread will probably be more rapid in the future. For a more detailed account of the situation with respect to this insect reference is made to the report of Harold L. Bailey, who has served very efficiently as assistant in charge of insect suppression. It is my opinion that sufficient money should be appropriated

by the state to hold this insect in check in the territory now infested so that it will not spread to the westward. This insect is a serious pest to orchard, shade and forest trees, and if allowed to become established in the state, the expense to property owners to prevent defoliation of trees will be great indeed.

EUROPEAN CORN BORER.

The European Corn Borer has not yet been found within the borders of the state but at this writing is established in New York townships adjacent to the Vermont-New York border of Bennington County. The quarantine against the importation from Massachusetts, New Hampshire, New York and Pennsylvania of stalks or ears of the corn plant and other plants likely to carry this insect remains in force. It has been found necessary to police the borders of the state in Bennington County to see that no green corn was brought into the state from the quarantined area in New York. Some scouting will also be done in Bennington County towns adjacent to the New York border this fall. How serious this pest will prove to be in Vermont is not known, but every precaution should be taken to keep it out because the corn plant is of great value to the agricultural industry of the state.

I recommend that provision be made in the appropriation for the next biennium so that adequate measures may be taken to cope with this insect should it come within our borders.

WHITE PINE BLISTER RUST.

White pine blister rust suppression has been under the immediate direction of Chief Forester W. G. Hastings, and reference is made to his report for a detailed statement in regard to this problem.

It seems to be the opinion of experts that the blister rust disease can be controlled at a moderate expense by methods which have proven satisfactory. In the spring of 1917 the white pine stock in the state nurseries at Sharon and Burlington was plowed under for the reason that this stock had been subjected to infection and owing to the nature of the disease it was felt that the state would not be justified in distributing to its citizens nursery stock for planting forests which would stand a good chance of being destroyed by disease. An embargo was placed against the importation into the state of white pine. It is

now the opinion of the chief forester that control measures have become so effective that white pine should be again planted in our nurseries for distribution and that the embargo should be raised. The white pine produces very valuable timber, its growth is rapid and it is well adapted to planting in many sections of Vermont.

I recommend that the embargo be lifted so that nursery stock can be imported into the state from nurseries which are free from blister rust and that planting be resumed in our nurseries.

APIARY INSPECTION.

J. E. Crane of Middlebury, C. E. Lewis of East Shoreham, F. L. Stearns of North Bennington and C. H. Carpenter of Enosburg Falls have served as assistant apiary inspectors during the biennium. The following table shows the work done by these inspectors and reference is made to the financial statement for the expense involved:

	J.E.Crane	C.H.Carpenter	C.E.Lewis	F.L.Stearns
Number of apiaries visited	10	662 (colonies)	46	167
Number of apiaries found diseased	28 (colonies)	20	28	14
Number of colonies treated	0	10	99	58
Number of colonies destroyed	0	10	12	4

COW TESTING ASSOCIATIONS.

H. E. Bremer has served during the biennial period as supervisor of cow testing associations. During the war period it was very difficult to secure the right kind of men to conduct these associations, and the number of associations fell off very rapidly. Now that more competent men are available it is expected that the number of associations will increase.

The cow testing association has been an effective instrument in Denmark for the weeding out of poor dairy cattle, with the result that the average production of the dairy cows of Denmark is from 7,000 to 8,000 pounds per year, or nearly twice the average production of Vermont dairy cows. If the labor of our farmers employed in dairying is to bring adequate rewards there is great need that the number of these associations be materially increased.

CREAMERY INSPECTION.

Mr. H. E. Bremer has also been in charge of the creamery inspection work for the greater part of the biennial period. The state has been divided as heretofore into three districts, each one of which has been in charge of a deputy inspector. George Gorman of Rutland, George S. Cook of East Hardwick and F. J. Miller of St. Johnsbury have served very efficiently as deputy inspectors. The following table shows a summary of work done at the plants during the biennial period:

	1920	1921	Total
Samples tested for butterfat	11,290	11,516	22,806
Acidity tests	8,442	7,101	15,543
Moisture tests	315	423	738
Sediment tests	8,137	5,490	13,627
Tests for solids	6,696	4,988	11,684
Applicants for tester's license examined	70	53	123

The problem of keeping the bacteria count of milk shipped to city markets within the limits allowed by city health boards has been an increasingly difficult one, and has made it necessary for the creamery inspectors to expend a greater amount of time in connection with this work.

The examination of Babcock test operators and the checking of their work has, in my opinion, resulted in very much more efficient testing than heretofore.

RECOMMENDATIONS.

There is probably no line of activity undertaken by the department more important than the work in creamery inspection. At this writing the U. S. bureau of markets report shows that there is a difference in price of nine cents per pound between 87 score butter and 92 score butter on the Boston market. This difference will probably average at least five cents per pound during the entire year. While the premium is not so apparent in the case of milk, sweet cream and cheese, it nevertheless exists. It is my opinion that the farmers of Vermont could easily add to the value of their dairy products \$2,000,000. annually by the exercise of greater care in the production of quality. The new tariff law enacted by the Congress of the United States places a tariff of 20 cents per gallon upon sweet cream. This will tend to increase the sweet cream market of Vermont dairies and our farmers should capitalize this opportunity by producing a better quality which will give satisfaction in the market and command a good premium.

I recommend that the creamery inspection service be strengthened so that this work can be carried on efficiently.

DAIRY MANUFACTURING.

V. R. Jones has served as dairy manufacturing specialist for the department during the biennial period. His work is described in detail in his report published on page 28. Mr. Jones' work has been of great value in assisting creameries in meeting the requirements of city health boards, in their general manufacturing and operating problems and in improving quality of their product.

FARMERS' MEETINGS.

Andrew Elliott of Galt, Ontario was employed during the fair seasons of 1920 and 1921. Mr. Elliott's time was employed in doing judging and demonstration work at our county fairs and when not so employed lectures were given at grange and other meetings.

Numerous addresses have been given by the staff of the department at grange meetings, creamery meetings, et cetera.

MARKETING OF FARM PRODUCTS.

Mr. Lionel G. Mulholland has served as market agent of the department during the biennium. Reference is made to his report on page 35 for full particulars regarding the lines of work pursued during the period. Much of his time has been spent in studying the problem of marketing dairy products, which is the chief interest of the Vermont farmer. He has, however, made investigations in regard to the marketing of maple sugar and hay. A manuscript has been prepared, based on such studies, of a bulletin relating to the marketing of hay, which funds of the department have not permitted us to print up to this time.

CREAMERY FEDERATION.

The plan adopted for a federation of Vermont cooperative creameries was outlined in my last report. The purposes of this federation as outlined by the by-laws adopted by the corporation were as follows:

1. For the supervision of accounting for member creameries.
2. For the buying of supplies for such member creameries.

3. For the selling of products manufactured by such member creameries.

4. To contract with two or more member creameries for the purpose of supervising the manufacture of and selling the entire output of such creameries in such form and manner as the sales manager may direct, the receipts from such sales to be prorated to such member creameries on the basis of the amount of product contributed, subject to such equalization for difference in cost of transportation, quality of product and cost of manufacture as a board of equalization composed of a representative from each contracting member and the board of directors of this corporation may determine; and also subject to deductions for expense as in these by-laws provided.

At this writing the federation has functioned only along the line of selling products manufactured by the member creameries, although an attempt has been made to secure a requisite number of creameries to institute the accounting service.

Five creameries are now enrolled as members of the federation. The results have been very satisfactory from the selling standpoint, as shown by the prices paid by the member creameries. It is my opinion, however, that there is great need for strengthening the federation and enlarging the scope of its work if it is to play the part which it should in the marketing of Vermont dairy products. I believe that experience has abundantly justified the belief that we must have in the state a field service and in the market a sales service, if the highest possible success is to be attained. If we are to follow in Vermont the plan of a federation of local creameries, owned and operated by the communities which they serve, instead of the plan of merging our co-operative creameries into one large central organization, it seems to me that we must have a general manager in the state who has a knowledge of the handling of dairy products and their manufacture, and also sufficient experience in the actual management of creameries to enable him to give advice to local boards of directors as to problems of management. This may not be necessary in all cases, but the great majority of our cooperative creameries are suffering from lack of managerial ability, which could be supplied by such a man. It seems to me, further, that the federation should employ inspectors who will inspect the product at the farms, so that it will be cared for and will be delivered to our plants in better condition. Our dairy manufacturing specialist has found at a number of plants in the summer months that fifty per cent or more of milk was being de-

livered in a condition unfit for shipment. Such a state of affairs would ruin the Standard Oil Company, and I do not believe our dairy industry can be built up to the highest success on such a foundation of poor product.

I think we should also have available to the general manager commodity specialists, who would supervise the processing of our milk, or manufacturing all surpluses into butter or cheese or other by-products, so that the quality would be the finest possible.

In the city, I believe there should be a salesman who would devote his entire time to marketing the products of the federation and that he should have a laboratory so that the quality of milk and other products arriving on the market could be checked continually and any defects noted, without waiting for the health authorities to find fault. Later on, a pooling plan could be devised which it seems to me could effect many economies in that instead of making a little butter and cheese at each plant, several plants could be taken out of the milk shipping market and devoted to the manufacture of these commodities in times of surplus.

There are now in the state thirty-two cooperative creameries which have been organized under the cooperative law passed in 1915 and which we know are truly cooperative creameries. These creameries probably do a business in excess of \$5,000,000. annually. An assessment of one per cent of the gross business, which would not be burdensome, would enable the federation to employ the specialists outlined above, and their services would add to the value of their product several times the cost of maintaining the federation.

As I see the matter, the formation of such a federation for the purposes above indicated would do more to put the dairy industry of Vermont on a good solid substantial basis than anything which could possibly be done. There would be no objection whatever to cooperation with other parts of New England in the establishment of milk prices, but experience this summer seems to have demonstrated that high milk prices pulled down by an inefficiently handled surplus offer no real remedy to the dairyman in the way of actual returns on his entire output.

SEED POTATO INSPECTION.

The plan of seed potato inspection and certification adopted by the department in 1914 has been continued through this biennial period with such modifications as experience seems to have justified. The plan is based on en-

rollment of fields by growers before July 1st, by making written application to the state department of agriculture for inspection. Two inspectors, Harold L. Bailey of Bradford and Alfred H. Gilbert of Burlington, have been employed in this work during the inspection season. The inspectors make two visits to each enrolled field, one early in the season and one later just before the vines are ready to die. Fields which come within the adopted standards from the standpoint of mixture with other varieties and freedom from objectionable diseases are given certificates at the end of the season, showing that the field in the opinion of the department is fit for seed purposes.

Tags are issued by the department and paid for by the grower which may be used on sacks containing potatoes from certified fields. As a result of experience obtained in the marketing of the 1920 crop of potatoes it was found necessary to deny the use of tags to growers for use on containers unless the contents of such containers were inspected by an agent appointed by the state certified seed potato growers' association and approved by the department. If the inspector found that the potatoes packed in the container were not graded in accordance with the standards prescribed, the use of the tag was refused. The wisdom of this course is apparent from the general satisfaction expressed by purchasers of the crop of 1921.

There is probably no line of work undertaken by the department which has given such good results in the way of financial returns to farmers as the work in certifying seed potatoes. In the fall of 1921 a representative of this department found at two stations in Vermont table stock being loaded into one car on a siding and certified seed being loaded into another car, at an advance of \$1. per bushel over the price paid for table stock. It is probable that an equivalent premium will be paid for potatoes of the 1922 crop.

Experience has demonstrated that certified seed from Vermont has given excellent yields in other states as compared with native stock or stock from other states. We have the prospect of building up a splendid business if our farmers will become expert in the growing of potatoes.

The following table shows the progress of potato seed certification in Vermont during 1921 and 1922:

	1921	1922
Total number of inspections	201	280
Total acreage inspected	780	1179
Average area of field inspected (acres)	3.87	4.21

Number of fields certified	130	96
Number of acres certified	480	553
Percentage of inspected fields passed ..	64.6	46.8
Average area of certified fields (acres)	3.69	5.75
Estimated total yield (bushels)	120,960	110,600

RECOMMENDATIONS.

At the annual meeting of the state seed potato growers' association, held at Ira in August, 1922, the seed potato growers voted that in their opinion an enabling act should be passed to permit the commissioner of agriculture to assess applicants for seed certification the cost of making the necessary inspections. I am informed that Vermont is the first state whose growers have voluntarily made such a request. I recommend that an act be passed by the incoming legislature which will permit the commissioner of agriculture to make such assessments to be paid into the state treasury and to be used for defraying the expenses of seed certification.

EXHIBITIONS.

Exhibits were made by the department at the Eastern States Exposition in Springfield, Massachusetts in 1920 and 1921. This exposition draws a crowd of people from the consuming centers of the eastern states where our products find a market and it is a splendid opportunity to exhibit our wares to the consuming public. The Vermont exhibit has comprised our principal farm products including potatoes, hay, vegetables, fruit and particular stress has been laid upon maple and dairy products.

DEPARTMENT OF AGRICULTURE

Financial Statement, July 1, 1920, to June 30, 1922.

	1921	1922
DISBURSEMENTS		
Commissioner of Agriculture:		
Salary.....	\$ 3,000.00	\$ 3,000.00
Travel.....	574.08	794.40
Hotel.....	756.82	622.00
Office Expenses:		
Furniture and Office Supplies.....	532.62	604.72
Postage, Telegraph, Telephone.....	1,019.70	1,234.64
Stationery and Printing.....	140.90	266.78
Freight, Express, Cartage.....	134.00	94.11
Instruments, Tools, etc.....	11.13	373.00
Clerical Force:	3,232.50	3,700.00
Dairy Manufacturing Specialist 1921 1922		
Salary \$ 2,479.92 \$ 2,479.92		
Expenses 1,808.72 2,025.87		
	4,288.64	4,505.79
Creamery Inspectors 1921 1922		
Salaries \$ 4,694.25 4,672.44		
Expenses 3,657.15 3,921.02		
	8,351.40	8,593.46
Supervisor Cow Test Associations: 1921 1922		
Salary \$ 2,400.00 2,400.00		
Expenses 1,196.87 1,114.47		
	3,596.87	3,514.47
Apiary Inspectors: 1921 1922		
Salaries \$ 106.00 \$ 138.00		
Expenses 187.32 283.82		
	293.32	421.82
Nursery Inspector 1921 1922		
Salary \$ 66.00 \$ 69.00		
Expenses 81.68 106.05		
	147.68	175.05
Farm Labor and Sales Agent 1921 1922		
Salary \$ 952.00 \$ 541.56		
Expenses 788.92 399.22		
	1,740.92	940.78
Field Agent in Marketing 1921 1922		
Salary \$ 925.00 \$ 2,400.00		
Expenses 1,448.68 1,517.13		
	2,373.68	3,917.13
Plant Pathologist 1921 1922		
Salary \$ 600.00 \$ 700.08		
Expenses 353.55 373.27		
	953.55	1,073.35
Agricultural Education 1921 1922		
Springfield Exhibit \$ 1,000.00 \$ 2,072.17		
Institute Speakers 544.91 389.96		
Lantern Slides 11.24		
Exhibits at Vt. Fairs 52.10 30.46		
	1,608.25	2,492.59

	1921	1922
Special Assistance.....	\$ 31.98	\$ 156.16
Dues, Nat'l. Association of Commissioners of Agriculture.....	25.00	25.00
Advertising.....	22.40	.....
Crop Reporting Service.....	.....	574.26
Miscellaneous.....	44.20	47.27
Total Expense for years ending June 30, 1921 and 1922.....	32,879.64	37,126.78
Add previous year's accounts, paid after July 1.....	919.58	1,987.22
	\$33,799.22	\$39,105.00
Less Current accounts paid after July 1.....	1,978.22	1,285.90
TOTAL DISBURSEMENTS FOR YEAR ENDING JUNE 30, 1921 and 1922.....	\$31,821.00	\$37,819.10
RECEIPTS		
Allotment from appropriation for Agriculture and Forestry.....	\$29,320.00	\$37,355.00
From Contingent Fund.....	2,500.00	.....
Credit on License Fee Refunded.....	1.00	.....
From Allotment for Insect Suppression.....	.....	464.10
TOTAL RECEIPTS.....	\$31,821.00	\$37,819.10
TOTAL DISBURSEMENTS.....	31,821.00	37,819.10

INSECT SUPPRESSION

Financial Statement, July 1, 1920—June 30, 1922.

	1921	1922
DISBURSEMENTS		
Assistant in Charge	1921	1922
Salary	\$ 1,999.92	\$ 1,974.29
Expenses	908.53	1,078.44
	\$ 2,908.45	\$ 3,062.73
Assistance.....	1,703.14	3,423.90
Supplies.....	61.31	59.27
TOTAL DISBURSEMENTS...	4,672.90	6,535.90
RECEIPTS		
Allotment from appropriation Agriculture and Forestry.....	4,672.90	6,535.90
Total disbursements.....	4,672.90	6,535.90

REPORT OF H. L. BAILEY**ASSISTANT IN CHARGE OF INSECT SUPPRESSION.**

I respectfully submit report of my work as Assistant in Charge of Insect Suppression for the biennium just ended.

The biennial period just ended has been marked by no spectacular outbreaks either of native or of imported insects and, so far as it is possible for us to know, none of those species mentioned in my last report as threatening us from the outside have been introduced. I have endeavored previously to correlate my reports so as to avoid repetition of general information as to details of description, life histories, etc. of the insects considered from one year or one biennium to another. Continuing this practice, the present report consists largely in the bringing up to date of the subject matter contained in the preceding reports and it should be considered in connection with them.

THE GYPSY MOTH (*Porthetria dispar*).

This insect has ranked far above all others in importance from the control standpoint. It is the only one against which organized work has been directed during the past two years, and it is in the supervision of such work in addition to personal scouting, investigation and other activities connected with the control of the gypsy moth that a major portion of my time has been spent.

In July, 1920 the line of gypsy moth infestation in Vermont took in practically only the Connecticut River towns from Barnet to Putney inclusive, together with a few of the towns adjoining to the westward. The latest information available places within the known infested area a zone about twenty-five miles wide along the Connecticut River from Waterford to Springfield and all of the territory south of that point and east of a line running, roughly, from Ludlow to the northern end of Pownal.

This advance of the gypsy moth within the state, although serious, is not, however, surprising nor, on the whole, discouraging. For fifty years the insect has been spreading westward from eastern Massachusetts through New Hampshire, and the fact that the western border of the latter state has been infested—rather heavily in some places

—for several years, and has been for the most part outside the scope of either state or federal control operations, would make a certain amount of infestation on our side of the Valley practically unavoidable. Such infestation has not in most instances spread beyond the bounds within which it might naturally be expected to appear, that is, the western slope of the Connecticut Valley. Except in the southern part of the state, the results of the 1921 scouting season in comparison with those of 1920 were encouraging. The apparently rapid spread of the gypsy moth through Halifax, Whitingham, Readsboro, Stamford and Pownal as well as a rather tenacious hold which it seems to have gained in Weston, Landgrove and vicinity have presented the most alarming feature of the situation, but since a similar westward spread was reported in Massachusetts, extending into New York State, this also, was to be expected. The southernmost infestations were light, consisting of but a few scattering egg masses; and by careful work it may still be possible to keep, the pest entirely east of the mountain range.

This should, in fact, be the first aim of the work. The Green Mountain Range, or, in the extreme southern part of the State, the Hoosac Range, presents the first real natural barrier to the progress of the insect. Throughout these mountains there are, of course, many apple trees, especially along such passes as are or have been settled, but the great bulk of the country is covered either with coniferous trees of wide stretches of northern hardwoods neither type of growth constituting favorite feeding material for the pest. As has been pointed out previously, the gypsy moth at first confines itself almost entirely to orchard or scattering trees, only working its way into forest lands after trees in the open country have been thoroughly infested. There is, therefore, much better opportunity to locate such infestations as there may be through this mountain region than is the case where the country is largely settled and orchard, shade and scattering trees predominate. For the first time a certain number of towns in the state have been definitely classed by the federal gypsy moth office as "inside towns" and are therefore relegated to the state for the carrying on of any control work which may be done in them. The scouting work of the U. S. Bureau of Entomology is confined to a band of territory, averaging about twenty-five miles in width, completely around the New England infestation from Maine to Long Island Sound. The gains of the moth in the southern part of the state have, therefore, taken it so far that Vernon, Guilford, Halifax, Brattle-

boro, Dummerston, Putney and Westminster are left east of this "outside" or border zone in which the federal work is carried on. Vernon was found so generally infested that it has been placed in the class of heaviest infested towns, designated in red on the quarantine map. From such territory materials affected by the regulations may not be shipped without inspection even into the more lightly infested area which is colored green on the map.

Although a considerable portion of the state is now infested by the gypsy moth, no section is as yet heavily infested as compared to regions in New England where the insect has been long established and where control measures have been relaxed. Such being the case, there is opportunity to hold down the increase of the pest within the territory infested so that no serious damage may be done, and at the same time to check the westward spread. If allowed to multiply unchecked the rate of reproduction of the gypsy moth is so great that the ensuing damage to the orchard, shade and forest trees will be severe indeed.

Lack of sufficient funds has made it impossible for the Bureau of Entomology to complete all the scouting work which was considered necessary in the state, and it has, therefore, been incumbent upon our Department to assist in the work to the extent of our resources. During both scouting seasons of the past two years I arranged to employ trained crews which had been in the service of the federal government. In this way much more was accomplished for the money spent than would have been the case had we been obliged to break in new men on the job.

While our funds were not sufficient either year to allow us to cover all the infested territory left undone by the U. S. Bureau of Entomology, our efforts were applied where the need seemed greatest, and I believe much good will result from them. It has been our policy to devote the most extreme care to the outside border and such territory as it may be found necessary to leave uncovered is assigned to the easternmost part of the state.

I did much gypsy moth control work personally in addition to supervising the work of the crews. This included scouting in the towns of Bradford and West Fairlee, applying raupen-lime and burlap bands to the trees in many of the larger infestations, and assisting the federal agents in planning spraying operations and securing permits for the same. A large high power truck sprayer was used by the Bureau of Entomology for spraying the higher trees, while a smaller power sprayer was devoted to orchard work. One of the largest of the spraying operations was conducted

in Newbury in the spring of 1922. Landgrove, Weston and Vernon were other points at which much spraying was done.

While the gypsy moth work is not carried out technically on a cooperative basis as is the case with the white pine blister rust and many other projects, it has been my purpose to keep in touch as closely as possible with the federal office in charge of this work, under the Bureau of Entomology; and to work in connection with it so far as circumstances permitted. I have received much valuable information and assistance through the courtesy and attention of Mr. H. L. McIntyre and his assistants as well as from Mr. A. F. Burgess.

As previously, I have cooperated with the staff in charge of the Parasite Laboratory at Melrose, Mass. in collecting native larvae for experimental purposes and I distributed a number of colonies of parasites received from the Laboratory. These were all of a species of egg parasite (*Anastatus*) the adults being minute winged insects which deposit their own eggs in those of the gypsy moth. The issuing parasite larvae naturally destroy the imbrary gypsy moth larvae.

I attended a conference of state and federal officials in charge of gypsy moth work at Boston in November, 1921, at which the general situation was considered. The sense of the meeting was that scouting for egg masses on the "outside territory", together with supplementary measures such as spraying and banding of trees, constitutes the most feasible plan of action for the checking of the spread of the pest, but that an increased amount of work ought to be carried out in the way of securing and distributing new species of parasites. Very encouraging results have been obtained in the more heavily infested regions from the introduction of such parasites as we already have in the country.

STATISTICS OF SCOUTING RESULTS, 1921-22.

(Federal and State Crews, in Vermont)

Number of Towns Scouted	73
Number of Towns Infested	48
Number of Towns Not Infested	25
Number of Infestations (Total)	472
Number of Egg Masses (Total)	2076
Greatest number of egg masses found in one town (Westminister)	296

Newbury, Rockingham, Vernon, Weston and Putney all had over 150 egg masses.

THE EUROPEAN CORN BORER (*Pyrausta nubilalis*).

This insect, mentioned in some detail in my last report, has become considerably more of a menace than was the case two years ago, since several New York towns adjacent to Bennington County have been found to be infested. These towns are within the limits of the general eastern New York infestation. Last year several towns on our side of the line were scouted for the presence of the borer, by the federal men engaged in Corn Borer extermination, but so far the insect has not been located in Vermont. As has been pointed out previously, quarantines, both state and federal, are in force to prevent the transportation of corn and other vegetables in which the insect might be present into the state from infested sections. Information received from Mr. L. H. Worthley, Federal Expert in Charge Corn Borer Extermination, points to the fact that a considerable amount of green corn has been brought into the Bennington markets from Albany and vicinity. Since the latter territory is known to be infested, plans have been made to obviate this danger of introducing the insect into the state, by the enforcement of the quarantine. In 1921 this work was attended to entirely by the federal agents; but for the present season it appears to be necessary for the state to carry out such measures as may be undertaken.

The European corn borer, like many other cereal and green truck pests, is exceedingly difficult to control after once it gains a foothold. There are no known feasible suppressive measures short of the actual gathering up of the plants likely to be infested and treating them in some manner so that any insects within them will be killed. Crushing, steaming, burning etc. have been tried. If it were confined to corn alone, the problem would still be a difficult one to solve, but inasmuch as nearly every plant with a soft pith large enough for the larvae to work in seems to be attacked, extermination is practically impossible over any extensive area.

It is certainly worth our while to stand the insect off so long as possible if practical means present themselves. With adjoining territory in New York infested, however, and no exterminative measures being carried on there, it is more than likely that the insect will work itself over the border by gradual spread, if not by transportation in infested plants.

The corn borer is a serious pest in any event, but from the fact that it has appeared to be single brooded in New York, we have less to fear from its invasion than would

be the case if it passed through two generations each year as it does in eastern Massachusetts.

It is important that people throughout the state should keep a sharp lookout for the presence of the corn borer and report any suspicious cases, for immediate action might be of great value in rooting out any isolated colonies which appear. Meanwhile we may hope that some valuable information in the matter of control may be obtained from experimental work now being carried on by the federal government, both in the way of hand measures of control and in natural parasitism.

THE CORN EAR WORM (*Heliothis obsoleta* Fab)

Numerous specimens of insects infesting corn have been submitted to me as possible European corn borers. They have all proved to be native species of slight importance to us. Most common of these has been the corn ear worm, known, also, as the tomato fruit worm, the cotton boll-worm and the tobacco false budworm. This species was more plentiful than usual last season, presumably owing to the late continued warm weather in the fall. The larva is a brownish smooth caterpillar about an inch and a half long when full grown. It works among the kernels of corn and is especially destructive to sweet corn. The adult is a yellowish brown moth.

THE LITTLE GRAIN MOTH (*Tinia granella*).

In the spring of 1921, I investigated, with Mr. R. W. Harvey, County Agricultural Agent of Windham County, a suspected case of corn borer infestation in Wilmington. It appeared that a certain lot of flint corn on the ear had been imported from Connecticut, indirectly through North Adams, Mass. Some of it had been kept over a year, and several of the farmers who had purchased it noticed small larvae among the ears together with a considerable amount of webbing and other results of their work. While it was evident immediately that this insect was not the European corn borer, its seriousness as a stored grain pest under certain conditions was manifest, and I took sufficient material to rear adult specimens from the larvae. I am indebted to Mr. D. J. Caffrey of the U. S. Bureau of Entomology for the identification of the species. The habits of this insect are very similar to those of the Angoumois grain moth. Fumigation of the grain infested, with carbon bisulphide, offers the only effective remedy.

THE STALK BORER (*Papaipema nitela*).

This is a species of native borer which works in corn tomatoes etc. and which may easily be mistaken for the European corn borer by those who do not have the appearance of the latter species well in mind. The larvae are larger, however, and are marked with five stripes running lengthwise of the body.

THE ELM LEAF BEETLE (*Gallerucella luteola*).

The elm leaf beetle has continued plentiful in the range of its infestation, and during the summer of 1921 did especially serious damage to the elms of Middlebury. Effective use was made of the municipal sprayer early in the present season, however, and decidedly less destruction of the foliage is noticeable at present. The elms in Brandon are suffering from a very severe attack of the beetle this season. Unless thorough spraying is done there early next summer very serious injury to the trees may be expected. As I have repeatedly pointed out, the only safe plan for the protection of the trees in any of the towns infested by the elm leaf beetle involves the owning or full use by the authorities of a high power sprayer.

THE SAN JOSE SCALE (*Aspidiotus perniciosus*).

The San Jose scale has apparently made no gain in territory infested since the date of my last report. In Brattleboro I have noticed a few cases in which the insect showed a tendency to increase, but the situation is in no wise disturbing. Annual or even biennial spraying with lime-sulphur or similar material appears to be sufficient to keep it within bounds, and I believe there is slight danger of any considerable spread of the scale in the state. Outside of the southeastern corner of Windham county, climatic conditions are not favorable to it, and although it may continue to exist at any point where it has been liberated unless control measures are exerted, such infestations are readily stamped out if caught in time and the work is thorough. At least this has been the case in several isolated infestations the histories of which have been given in preceding reports.

THE TENT CATERPILLAR (*Malacosoma americana*).

A native insect, but one which goes from such extremes of plentitude to those of scarcity that its periodical re-

currence in great numbers makes it appear like a new pest to many people, the tent caterpillar, seems to be on the way to a peak in the line of its prosperity.

It was extremely abundant in 1913-14-15, but for the three years following it seemed almost entirely absent from the state, due of course to mortality caused by natural agencies of control. In 1920 it had visibly begun to pick up in numbers and for the past two seasons it has shown a notable increase. Multiplying as it does under such conditions, we may expect a tremendous visitation by the species about 1924 or 1925. Such being the case, much good could be done toward reducing the damage of such an outbreak if people in general would take it upon themselves to destroy the insect wherever opportunity offers before it has gotten entirely out of hand. The destruction of one egg mass or the occupants of one tent next season will probably be the equivalent of the destruction of twenty-five egg masses or tents the following year.

In three of the four stages of its life history the tent caterpillar is subject to hand control measures.

The egg masses "saddled," as Thorou has said, upon the twigs of wild cherry and apple trees may be picked off and burned any time between July and April.

The larvae may be collected in masses within the white "tents" in late April and May. Crude creosote applied to the "tents" by means of a swab on a pole is said to destroy the caterpillars; an old method is that of burning them with kerosene torches, and various other means are used to "worm the trees." The human hand encased in an old glove makes the most efficient collector, however, and the sole of a good sized shoe makes a most effective implement of destruction when the masses of caterpillars have been thrown on the ground.

The "pink spray" i.e., arsenate of lead applied just after the leaf buds open, when the blossom buds are pink, serves a very useful purpose in the control of the tent caterpillar.

After the caterpillars have matured and spun the familiar yellowish cocoons much good can be done by collecting and burning them.

THE BROWN-TAIL MOTH (*Euproctis chrysorrhoea*).

The brown-tail moth, the control of which was formerly the most important objective of our work is definitely outside the limits of our state, and while there is danger that it may again spread to our borders, the situation

presents no serious aspects, provided careful watch for its appearance is maintained so that suppressive measures may be undertaken immediately.

SADDLED PROMINENT ETC.

The saddled prominent, the green striped maple worm, red humped apple tree caterpillar and yellow necked apple tree caterpillars, all of which were exceedingly plentiful during the previous biennium have again subsided and are so scarce as to be hardly noticeable. The fall web worm, however, has continued to do more or less damage to apple and shade trees.

THE POTATO LEAF-HOPPER (*Empoasca mali*).

This insect which is of considerable importance in the middle West on account of the so-called hopper-burn which it causes on the foliage of potato plants has made its appearance in Vermont during the past year. It is somewhat similar to the aphid in its form, habits and life history and, like the aphid group, is difficult to control by spraying. Nicotine sulphate added to the spray solution may be of some benefit in controlling this insect and thorough Bordeaux applications have a repellent effect.

EDUCATIONAL WORK.

FAIR EXHIBITS.

I attended, with the educational exhibit, the fairs at St. Johnsbury, Northfield, Tunbridge, Rutland and the State Fair at White River Junction in the fall of 1920, and those at St. Johnsbury, Springfield, Rutland, Woodstock and the meeting of the State Horticultural Show at Rutland in 1921.

EXHIBITION CASES.

I continued the making and distribution of insect exhibition cases as described in my last report, and in addition to furnishing them to the agricultural high schools of the state I have placed such cases in most of the Farm Bureau offices for use of the County Agents as they see fit. Work on these cases is naturally carried on at those times of the year when field work is impracticable.

LECTURES, PRESS NOTICES ETC.

I have given several talks upon the subject of insect control and have endeavored to dispense information so far as opportunity offered in personal interviews and correspondence.

Press notices calling attention to various important phases of the insect situation have been sent out from time to time, and I prepared a rather full account of the gypsy moth conditions in the state for the New England Homestead. This article was published in August, 1921.

BULLETIN No. 32:

During the winter of 1921-22, I prepared an eight page bulletin entitled the Farm Orchard and the Gypsy Moth. Each copy is accompanied by a colored plate showing the different stages in the life history of that moth. 3,000 copies were printed.

ACTING NURSERY INSPECTORSHIP. !

For several months during the winter I acted as Nursery Inspector, owing to the illness of Professor M. B. Cummings, the regular inspector. The duties of the office throughout my incumbency were of a clerical nature only.

SEED POTATO CERTIFICATION WORK.

About a quarter of my time has been devoted to work in connection with the seed potato certification project, inspecting fields, organizing and starting the shipping inspection service and, in several instances, investigating controversies between buyers and shippers. In connection with this work I attended the field meeting and tour under the auspices of the Suffolk County Farm Bureau at Riverhead, L. I., June 29-30, 1922.

REPORT OF M. B. CUMMINGS

STATE NURSERY INSPECTOR BURLINGTON, VERMONT.

The nurseries of Vermont have been inspected annually in accordance with the State law. The period of inspection extends from April 1st to December 1st. The dates for the inspection work are set at such times as afford the best evidence of the general seasonal health of the plants. The pests of an ornamental nursery are not often those that are troublesome in a fruit tree nursery. For this reason it is better not to inspect all the nurseries in even a single month, but in accordance with conditions and the possibilities of finding certain pests, if present, and therefore being able to prescribe special treatment when required. The inspection work is therefore spread over a considerable period of time and care is taken to select good dates.

In general the nurseries of the state are clean, healthy and free of noxious insects and injurious plant diseases. This satisfactory condition is due in part to the timely and thorough inspection; in part to the vigilance and cooperation of the nurserymen; and in part to the precise regulations of the State of Vermont and the United States Government with respect to shipment of plants by freight, express, or by parcel post.

The need of inspection of imported nursery stock has almost ceased to exist, due very largely to the strict enforcement by the government of the Federal Plant Quarantine Act. Nurserymen have now discontinued for the most part the importation of stock except seeds and bulbs.

A list of the nurseries in Vermont that have been inspected and certified is given herewith:

State Forest Nursery	Burlington
State Forest Nursery	Sharon
John Wilson	Burlington
August Gebicke	Burlington
Elmer Gove	Burlington
Geo. H. Mass	Woodstock
F. H. McFarland	Waterville
G. E. Hunt	Rutland
Baker Seed House	Rutland
E. G. Hunt	Middlebury
C. E. Knapp	North Bennington

L. C. Holton.....	Bennington
A. L. Hall.....	Randolph
H. E. Day.....	Sharon
Geo. D. Aiken.....	Putney
Geo. H. Gassett.....	Putney
E. L. Dix.....	Dummerston
A. A. Halladay.....	Bellows Falls
Geo. D. Odell.....	Brattleboro
F. S. McKenzie.....	Woodstock
C. N. Bond.....	Brattleboro
R. H. Messenger.....	Brattleboro
Carl Hopkins.....	Brattleboro
J. E. Mitchell.....	Barre
Geo. H. House.....	Beebe Plains
Arthur Hill.....	Isle LaMotte
Ordway & Reede.....	Tunbridge

REPORT OF DAIRY MANUFACTURING SPECIALIST**V. R. JONES.****July 1, 1920 to June 30, 1922.**

The work in dairy manufacturing in giving assistance to the creameries in the state has continued as heretofore along the same plan as existed under the cooperative agreement with the U. S. dairy division in which that division aided in support of the work by appropriations from 1916 to 1920. In July, 1920 the U. S. government discontinued its appropriations for cooperative field work among the several states in which this work was carried on. Since that time the state has continued the extension work in dairy manufacturing entirely by appropriation through the department of agriculture.

The nature of the work which has been conducted in dairy manufacturing for this period has consisted briefly in assisting the creameries with their various problems such as factory management, increasing efficiency in operation, improving methods of manufacture and quality of products, encouraging the proper development of this industry.

REVIEW OF CREAMERY CONDITIONS IN VERMONT

We have in this state (July, 1922) some 230 dairy plants operating, classified as follows: Creameries—116; cheese factories—27; condensed milk plants—7; milk and cream shipping plants—81. Among these plants are 32 cooperative factories which have been organized since 1915, and 28 of the old type of cooperative factory. The volume of business being done by all cooperative plants for 1921 represents better than one-quarter of the total volume of business done by all dairy factories in Vermont. According to government statistics for 1921 Vermont did better than one-third of the dairy industry business in New England. The total value of all dairy products produced and sold in the New England states amounts to nearly \$100,000,000.00 annually. Fifty per cent of the fluid milk and sixty-two per cent of the cream received in the Boston market from New England states comes from Vermont. Vermont produces 67% of the butter, 81% of the cheese and 82% of the condensed milk manufactured in all the New England states.

INCREASE IN MANUFACTURED DAIRY PRODUCTS.

The dairy statistics compiled from the annual factory reports sent in to the Department of Agriculture by all the creameries in Vermont show for the year 1920 an increase of 13.2% of butter made as compared with 1919; and 1921 shows an increase of 11.8% more butter made than in 1920. The apparent feeling that Vermont is rapidly changing to the marketing of fluid milk is erroneous and the facts are that in 1920 and 1921 less fluid milk was sold from the state than in 1919. The years 1920 and 1921 show a decrease of about 1% in milk sold; 4.5% less condensed milk sold and a corresponding increase in sweet cream sold and butter made. There is an increasing demand for sweet cream from Vermont plants and some of the butter factories located on the railroad have gone more or less into the sweet cream business. However, the butter factories with good markets so far have found that the price offered for cream is usually for a short period and not sufficient in many instances to warrant discontinuing butter manufacture, when the extra cost of delivery every day to the factory, and the factory costs in separating, pasteurizing and cooling are considered.

IMPROVEMENT IN FACTORY SANITATION AND METHODS.

A decided improvement has been made in the sanitation and methods of factory operation as compared with conditions of a few years ago. Reports from the creamery inspectors show on an average improvement of 15% or more in all the factories. The factories built during the past three years, particularly the new cooperative plants, are modern, substantially built and well equipped.

FACTORY MANAGEMENT.

The extent of successful operation of the dairy plants throughout the state is largely dependent upon the efficiency of management. In some of the farmer-owned plants the mistake has been made of employing as manager one who has had little or no actual creamery training or experience, and this, sooner or later, has resulted in more or less loss to the stockholders through inefficiency. The manager of any cooperative factory which has made an outstanding success is the man who has had the proper training and experience in dairy manufacturing, who is familiar with the various factory operations, as well as possessing business ability. He is the man who at all times works for greater efficiency

in operating methods, strives for a greater volume of high quality products, renders a real service to the patrons and dealers, and one who has full charge of the creamery operations.

EFFICIENCY OF BUTTER MANUFACTURE.

Following is a table which shows the amount of butter made in Vermont since 1918, giving the percentage of overrun for each year:

	1918	1919	1920	1921
Butter made, pounds	11,680,928	11,087,108	13,614,777	15,428,802
Overrun, per cent	19.5	21.8	22.08	21.88
Average butter price	\$.51	.61	.61	.43
Average price paid for fat	\$.547	.662	.676	.456
Difference	\$.037	.052	.066	.026

The difference in overrun in 1921 as compared with 1918 amounts to 2.38%. On the amount of butter made in 1921 the increased saving in overrun amounts to 301,309 pounds of butter, or \$129,562.00.

IMPROVING QUALITY OF DAIRY PRODUCTS.

Assistance has been given to many plants by the dairy manufacturing specialist in improving the quality of milk and cream shipped, as well as with the manufactured products. In this connection, cooperatives and proprietary factories shipping fluid milk have had trouble from time to time with high bacteria count. In order that these creameries could continue to sell milk, it has resulted in using the microscope regularly in grading the milk, as received from the patrons and paying according to bacterial count. In addition to the bacteria count, regular tests are made for temperature, percent acidity and frequently for sediment. Practically every milk shipping plant now is equipped with a microscope which is used frequently in connection with determining the grade of quality. Improving the quality of milk or cream as received from the patrons, as a permanent measure, has become purely a management problem, and unless a premium is paid for the better quality of product, there is no apparent incentive for the farmer to incur the extra expense and care required in the production of a high quality product. Several of the cooperative and pro-

prietary plants have adopted the grading plan in payment for milk or cream, and their outstanding success in holding and developing butter markets and returning better prices to the patrons is due chiefly to the standardized quality. The standard for grading most commonly used is based on the maximum bacteria count of 250,000 per c.c.; acidity .17% and temperature 55 degrees F. for grade 1. The maximum acidity for sweet cream is 55 degrees F. in temperature and .20 percent acid for grade 1.

ORGANIZATION OF COOPERATIVE CREAMERIES.

Thirty-two cooperative creameries have been organized since 1915 and are operating. Nine have organized and started operations since 1920. The total authorized capitalization value of all these factories amounts to \$1,310,000. or an average authorized capital investment of \$40,000. for each organization. In general the cooperatives have made a success, and are operating the most modern and best equipped plants in the state to-day. Many of them have their plants and equipment fully paid for, are free from indebtedness, and pay liberal dividends each year. There has been a tendency in a few instances, however, through the eagerness to begin operations, to overestimate the volume of business and future growth, and to overinvest in buildings and equipment. There is a bright future for the farmer-owned plants however and it is apparent in various parts of the state that many more of this type of creamery will be operating within the next few years. The greatest possibilities for these plants have not been reached, and the best results from cooperation evidently will not be obtained until these creameries join hands. The present creamery federation, consisting of only six plants, is not large enough to attain the greatest value, and when the rest of the cooperatives can get together as one group, work in harmony with each other, standardize the quality of products handled and methods of operation at the several plants with the idea of increasing the efficiency in management, and giving the service in marketing which cannot be available individually, the problem will be solved on a sound basis and the greatest benefit obtained.

INVESTIGATION AND EDUCATIONAL WORK

Investigations have been made relative to factory operation costs, including cost of butter manufacture, cost of handling milk per hundredweight, and cost of handling

sweet cream. In factories where milk and cream are sold, and butter, cheese, condensed milk and casein are manufactured it is difficult to determine with any degree of accuracy the unit cost of the various products. At these plants the operating costs are based on percentage of the gross sales of products. Following is an average operating cost based on percentage of gross sales for four of the largest factories in the state which did a business of over \$2,000,000. in 1921:

Net returns to patrons (Delivered to market) . . .	86.94%
Total operating cost	14.06%
Labor cost	4.52%
Percentage of total operating for labor	32.14%

The average cost of butter manufacture for period June 1919 to May 1920, for a total production of approximately 3,000,000 pounds of butter was as follows:

Cost per pound butter	\$.0411
Labor cost per pound butter . . . . .	.0145

In 1921 the manufacturing cost of butter in the butter plants was on an average of 15 to 20 per cent less than the above figures. The expense involved in handling sweet cream, including cost of receiving, re-separation, pasteurization, standardization and cooling, labor, et cetera varies from three to four cents per pound butterfat. An average cost would be approximately three and one-half cents.

A survey was made of the standard of ice cream sold throughout the state, and it was found that out of about seventy samples analyzed for butterfat content, nearly fifty per cent were below standard. Most of the ice cream found below the legal standard was shipped in from out of the state. In this connection, it seems advisable that the creamery inspectors should, in cooperation with the state board of health, take frequent samples of ice cream and require that the legal standards be met.

EDUCATIONAL.

Assistance has been given at the creamery winter courses held at the University of Vermont, giving instructions in dairy manufacturing to the creamery managers and operators who are employed at different factories throughout the state. These courses are usually well attended, but owing to the inadequate equipment at the University dairy department, it is necessary to confine the work to men who

have already had considerable experience in creamery operation. This unfortunately does not give the younger men who are working as helpers in the plants an opportunity to develop themselves properly to take the places of managers in factories as the time warrants. In view of this fact, the regular short course has been discontinued and instead, a conference of creamery managers is held each year. At the creamery conference held in December, 1921, assistance was given in forming an organization of Vermont creamery managers and operators, for the purpose of increasing the efficiency of the members employed in their respective positions held at the various factories.

For the past two years assistance has been given through cooperative arrangements with the dairy department at the University of Vermont in holding monthly educational butter scoring contests at the creameries in various parts of the state. These contests have apparently been beneficial to the buttermakers in that the scorings held at the factories have given the men interested in the manufacture of butter an opportunity to see the butter judged and hear discussions on improvement of quality. From ten to twenty representatives of different creameries have attended the scorings which have been held at a different plant each month.

QUALITY OF BUTTER SHOWS IMPROVEMENT.

From the many samples of butter judged at the butter scoring contests and reports from the markets a more uniform and better quality of butter is being made to-day than for several years past. It is interesting to note, however, that the factories which use the method of pasteurization of cream and ripening with commercial starter to an acidity not exceeding .35% or pasteurized sweet cream butter, at every scoring contest won a score of from two to three points better than the raw cream product. There is an increasing demand on the markets for a milder flavored butter, with good premiums, and it is well for the butter plants which are to continue in the manufacture of butter to give this fact due consideration. The high flavored butter seems to be losing favor among the high class trade, and the markets in general.

MONTHLY NEWS LETTER.

A creamery and market news letter has been sent out each month to all the creameries in the state, giving information on various creamery operation problems and

marketing subjects. This publication is put out jointly by the Field Agent in Marketing and the Dairy Manufacturing Specialist. The first issue was sent out in May, 1920.

SUMMARY OF WORK.

Following is a brief summary of extension work in dairy manufacturing by the dairy manufacturing specialist covering the period for which this report is made:

Number of factories visited.....	421
Creamery meetings addressed.....	55
Creamery directors' meetings attended.....	54
Microscopic analyses of milk made.....	3,226
Samples butter judged.....	257
Samples of ice cream tested.....	78

RECOMMENDATIONS.

1. The Cooperative Creamery law, in my opinion, should be amended to eliminate difficulties which these organizations have met with in filing tax returns, mainly on account of reference being made to net profits. The cooperative creamery is really a *non-profit* sharing organization and the law should be amended stipulating "undistributed balance" or "undivided returns" instead of profits.

2. For the best success of a cooperative creamery, shares of stock should be distributed among a large number of producers, in order that sufficient volume of product may be received so that the plant may be operated at a reasonable factory cost. In order to avoid centering interest and responsibility, or control with a few stockholders, I would suggest that the par value of each share of stock not exceed fifty dollars and that at least fifty per cent of authorized capital must be subscribed, with a provision that no shareholder own more than ten per cent of the required issue of stock.

3. The testing of milk or cream for which payment is made on butterfat basis should be regulated by law so as to require that all milk or cream received in Vermont and sampled for butterfat analysis shall be tested within the state. As a further measure for accuracy in testing, regulations might be made requiring that creameries or stations keep on file all test records, signed by the tester, giving license number. These test records could be referred to by inspectors on inspection of the factory.

4. I would recommend that inspection be made regularly among stores and places where substitutes for dairy products are sold, enforcing particularly the oleomargarine laws, Sections 5944, 5945 and 5946 of the General Laws.

REPORT OF L. G. MULHOLLAND**FIELD AGENT IN MARKETING.**

Owing to a change in the policy of the Bureau of Markets, United States Department of Agriculture, regarding cooperative marketing assistance to the various states the cooperative agreement between the Bureau of Markets and the Vermont Department of Agriculture was discontinued on June 30, 1921. Since that time the marketing activities have been conducted by the State department without financial aid from the Federal Bureau.

The marketing work has been conducted with the idea of assisting producers with their marketing problems by increasing the efficiency of the present methods and in advocating changes which would aid most in their proper solution. (This was accomplished partly through investigations, organization, extension and service work and publications.

The major part of the work consisted in investigations relative to the methods of marketing dairy products, in rendering assistance to the dairy plants and in assisting in the organization of cooperative creamery associations. Investigations were conducted and marketing assistance given producers of hay, maple products, beans and other agricultural products. A part of the marketing activities consists in rendering direct service to the producer or producers. These activities extend into every section of the state.

In order to render practical and valuable assistance in the marketing of the various commodities it has been found necessary to know the requirements of each market, to keep in close touch with the market centers and to be personally acquainted with some of the largest and most reliable receivers of the various products. In order to accomplish this, monthly trips were made to the Boston market and other New England markets and to the New York City market.

The marketing work is discussed under the following heads:

(1.) Investigations, (2.) Organization, (3.) Extension work, (4.) Service work, (5.) Publications, (6.) Recommendations.

INVESTIGATIONS.

The marketing problems which have been investigated during the past two years and problems now under consideration and investigation with the purpose of assisting the producers in bettering their market conditions and methods are as follows:

MARKETING OF HAY.

"The Marketing of Vermont Hay" is the title of a manuscript prepared as a result of investigations relative to the movement and the marketing processes of hay in the leading New England city markets, and in the New York City markets. The investigations were made to determine as nearly as possible the requirements of the different markets regarding the kinds and grades of hay demanded and the methods of handling and grading. Information was acquired from the representative wholesale and retail dealers concerning the methods used in the handling of hay upon its arrival in the city.

The manuscript discusses some of the important factors connected with the marketing of hay, and gives in some detail the particular requirements of the markets to which most of the Vermont hay is shipped, so that the producer may have a more intimate knowledge of the details involved in marketing his hay after it reaches the city. The summary of the investigations is as follows:

1. Vermont cannot be classified as a hay shipping state for less than five per cent of the hay grown annually is shipped out of the state.

2. The general practice of the producer in marketing hay, i.e., selling to the country buyer, is perhaps the best method for the farmers producing hay in small quantities for market. The problem of grading hay to meet the requirements of the different markets is a difficult one and can best be handled by the country buyer or shipper who can load and ship uniform cars, who knows the requirements of the markets and who is personally acquainted with the dealers.

3. Not over two per cent of the hay is shipped direct from the producer to the wholesale receiver or to the consumer.

4. In many instances, the costs of handling hay from the producer to the consumer amount to almost as much as the farmer receives. These costs range from \$17.00 to \$20.00 per ton.

5. Ordinarily when selling direct the producer who is experienced in shipping hay is able to save from \$6.00 to \$9.00 per ton.

6. Shippers should exercise more care in loading cars of uniform quality hay. Whenever cars of uniform quality hay cannot be shipped the consignee should specify on the bill of lading the quantity of each kind shipped.

7. Shipments of hay are often damaged in transit as a result of being loaded into dirty cars. Before loading, shippers should thoroughly inspect cars in regard to leaky roof, sides and defective doors.

8. Practically all the hay shipped is sold according to the description of the hay rather than according to grade. Producers who expect to market their own hay to wholesale receivers or consumers in any of the New England markets and who are unacquainted with the market requirements should, however, grade and ship their hay according to the National Hay Association grades. If shipping to the New York City market, producers should grade their hay in accordance with the New York City grading rules.

9. Producers who expect to ship any large amount of hay regularly will find it beneficial and advantageous to make connections with one or several reliable receivers and they should visit the markets occasionally in order to acquaint themselves with the receivers and with the general market grades and requirements.

10. Shippers should observe the following points in shipping hay:

Grade hay before baling.

Press large bales.

Load uniform quality in cars.

Unless selling according to description of hay, grade and specify shipments according to grade rules employed by the market to which the hay is shipped.

MAPLE PRODUCTS WAREHOUSE.

In working with the Marketing Committee of the maple products producers which was instrumental in assisting in the organization of the Vermont Maple Products Cooperative Exchange, Inc., the Field Agent in Marketing was asked to determine the proper location, from a transportation standpoint, of a central warehouse for the handling and processing of the maple products which would be handled by the Exchange.

In this investigation five suitable points were selected as the best possible locations for the erection of the ware-

house with a view of determining which one of the five places selected would be the proper location. In selecting the five points, attention was directed to the largest points of production, and the nearness to the principal markets which would reduce "back hauls" to the minimum. The five places selected were:

Brattleboro, Bellows Falls, Essex Junction, Swanton, Randolph.

The results of the investigation show that the entire production of sugar and syrup could be transported to Essex Junction at a less cost than to any of the other four selected points. The standings of the five selected locations in order of their total relative transportation costs are as follows:

SUGAR AND SYRUP.

Location	Less Car Loads	Car Loads
Essex Junction.....	\$29,407.46	\$21,865.39
Swanton	31,734.52	22,731.56
Randolph	31,713.33	23,510.39
Bellows Falls	34,490.34	25,525.72
Brattleboro	36,664.50	27,263.79

Essex Junction is shown by the transportation costs to be the best location for a warehouse. This is due principally to the fact that the largest production of syrup and sugar centers around this point, and that Essex Junction is accessible from all shipping points. To determine the extra transportation costs on the finished products from the warehouse to the various markets rates were secured and applied on the products from the five selected points to the Boston, New York and Chicago markets. In computing these costs the total transportation costs were figured from production points in each county (L.C.L. shipments) to the five warehouses, plus the transportation costs of the finished products (C. L. shipments) to the three markets. These figures are as follows:

	Boston	New York	Chicago
Essex Junction	\$60,864.72	\$60,181.12	\$76,567.74
Swanton	65,657.32	62,413.24	81,480.13
Randolph	61,481.62	63,487.11	78,873.92
Bellows Falls	57,402.12	62,664.12	81,650.62
Brattleboro	60,388.02	64,768.11	86,371.81

These figures show that from the Boston market standpoint Bellows Falls is the best location for the warehouse

and Essex Junction is the best location from the standpoint of the New York and Chicago markets. However, when the source of production is taken into consideration, Essex Junction would prove to be a better location in respect to the Boston market than Bellows Falls. The results of the investigation show that of the five points selected, Essex Junction from all standpoints is the best possible location of a central warehouse. The next best locations in order are:

Swanton, Randolph, Bellows Falls, Brattleboro.

The maple products exchange which commenced operations in the spring of 1922 located its central warehouse at Essex Junction.

COOPERATIVE DAIRY PLANTS.

Dairying is the most important branch of the agricultural industry in Vermont. The fourteenth U. S. Census (1920) shows that the value of dairy products exceeded \$26,000,000.00. To market these products in an orderly and efficient manner constitutes one of the largest marketing problems. These problems are, however, being slowly solved through the creation and growth of the farmer-owned cooperative creamery organizations. The dairy plants which now number thirty-two, since the new cooperative law went into effect in 1915, are making rapid strides and are gaining strength slowly but surely. They have proven that if properly managed they will return to the farmer more than will any other method of marketing his products. It is these cooperative plants which are forming the solid foundation upon which is being built the great dairy industry of the state.

During 1921, fifteen of the thirty-two plants shipped 55,005,552 pounds of whole milk valued at \$1,321,625.13. This amount is 22.5% of all the milk shipped from all factories in the state. They made an average return of \$2.406 per cwt. for the year to their patrons.

The next step in the cooperative plan is to join all of the cooperative creameries in the state into one cooperative organization or federation. This will change the existing method of individual marketing to a well planned, broad system of cooperative marketing—a system with wide expansive powers through which the individual plants can consolidate and thereby function as a well organized and efficient business concern. Competition in marketing can be successfully met through equal quality of products and service which can be rendered through consolidation of the individual units into a properly organized and properly

managed concern which will operate on the markets as a commercial unit.

Such a system of marketing will require a well established country end under the supervision of a general manager and a strong central selling agency located in the markets to have control of the marketing of all the products. This calls for adequate financing and competent expert management.

It is gratifying to note that a start has been made in the organization of a state federation, and it is hoped that the remainder of the cooperative creameries will soon join forces with the state organization.

ORGANIZATION.

Owing to a general satisfactory condition of the dairy industry and steady and higher returns from the sale of dairy products during the past year farmers have not been as active in organizing new associations.

Assistance has been rendered the following plants and communities desirous of starting cooperative creameries:

After the proprietary plant at Bethel was destroyed by fire in May, 1921 the producers organized a cooperative creamery and erected a new factory. This creamery commenced in February, 1922.

Farmers in the vicinity of Derby organized on March 17, 1922. An existing plant was purchased and operations begun on April 1.

The maple products producers organized a state marketing association in January, 1922 under the name, Vermont Maple Products Cooperative Exchange, Inc. The Exchange began operations in the spring of 1922, with headquarters at Essex Junction.

EXTENSION WORK.

Creamery organization meetings, annual creamery meetings, maple sugar producers' meetings, crop reporting conferences, marketing officials' conferences, farmers' picnics and other marketing conferences were attended and addressed on organization and subjects pertaining to better marketing. Conferred and advised with managers and directors of dairy plants, county agents and farmers for the purpose of assisting them with their marketing problems.

Assisted at the monthly butter scoring contests conducted by this Department and the Dairy Department of the

University of Vermont. These contests are proving to be of great value and benefit to the buttermakers.

Assistance was given some of the dairy plants in their accounting work and in the proper weighing, packing, shipping and storing of their products.

In the spring of 1922 some time was spent in assisting in obtaining a motion picture of the maple products industry. This picture is to be used in advertising maple products.

SERVICE WORK.

Many of the cooperative creameries were assisted regularly in obtaining better or additional outlets for their products. Outlets were obtained for milk, cream, butter, cheese and skimmilk. Suggestions and assistance were given in the adoption of brand names for butter, and for suitable stationery, shipping tags, et cetera.

One creamery which manufactures a uniformly high quality butter was assisted in obtaining better markets which returned from 2c to 2 1-2c per pound more than it was obtaining through consigning the butter in tubs to the open market. This will mean a yearly return of approximately \$2,000.00 more to this factory.

One creamery was assisted in obtaining a market for all its products in New York City. This required a permit from the New York Department of Health before shipments could be made.

Some time was spent in assisting several small creameries in selling a part of their butter direct to the consumer by parcel post. Prospective lists of customers were secured for these creameries and help given in packing, labeling and shipping the butter.

Farmers were assisted in obtaining markets for beans, maple products and other produce.

In cooperation with the American Railway Express Company circulars were printed dealing with the proper way to pack and ship eggs. These circulars were distributed to creameries, county agents, shippers of eggs and egg circles.

PUBLICATIONS.

The Vermont Creamery & Market News Letter, the first issue of which appeared in May 1920, is being issued each month from this office. This monthly letter which contains information relative to the manufacturing and

marketing of dairy products appears to be meeting with favor among the creamerymen, the daily and weekly newspapers and the dairy journals.

GENERAL MARKETING NOTES AND SUGGESTIONS.

There is an increasing all year round demand for sweet cream. During the spring and early summer of 1922 there was an exceptionally large demand for this product. Under production in the early spring months, a larger demand for cream for direct consumption and a larger demand by ice cream dealers were factors largely responsible for the increased demand. The supply was so short during this period that cream dealers and ice cream manufacturers were compelled to enter butter territories to secure the additional quantities required. The demand is steadier and much larger than it was several years ago so it is quite probable that a large part of the cream which formerly was manufactured into butter will be marketed as sweet cream at prices which will exceed the returns from butter.

Years ago milk and cream were produced in largest quantities during the spring and summer months. During the past few years the production has been more evenly distributed throughout the twelve months. This is important, for even production assists greatly in stabilizing the markets and assists producers and dairy plants in retaining regular markets for their products.

SUGGESTIONS.

The following few suggestions are made for the purpose of assisting in the establishing of more efficient methods of marketing:

(1.) A state wide organization or federation of the local cooperative creameries to insure a more efficient and more profitable system of marketing their products.

(2.) That the federation should not endeavor to establish a monopoly price, but instead establish milk prices on the basis of supply and demand and with definite relations to the principal manufactured by-products—butter and cheese.

(3.) Creameries with small volumes of product and located in close proximity to other plants should market at least a part of their output direct to the consumer by parcel

post. The premiums thus obtained from marketing their butter in this manner will enable them to make satisfactory returns to their patrons.

(4.) The Boys' and Girls' summer camps which number forty-five and which have an enrollment of 1,700 boys and 2,000 girls offer excellent markets for dairy products and other produce. It would seem advisable for the creameries and producers of other farm products to cater to the needs of these camps which would serve as direct outlets for large quantities of food products.

REPORT OF H. E. BREMER, IN CHARGE OF CREAMERY INSPECTORS

DEVELOPMENT OF CREAMERY INSPECTION.

The first creamery inspection in Vermont was made in 1913 by W. E. Ayres of Berne, N. Y., and was continued by him during 1914. From 1915 to 1917 inclusive the work was carried on by H. L. Wilson. From the first, the object of creamery inspection was two-fold. First, to observe the sanitary conditions of the various plants and of the processing equipment, as well as to make recommendations leading to improvement along these lines. Second, to examine the milk and cream delivered to these plants and where the product was below a medium standard to inspect the farms and make such recommendations as would improve the quality of the product. From this, one will observe that the object of the inspection work was primarily one of raising the standard of quality of the finished product. It was an educational work. The producers as well as the butter and cheese makers, needed instruction in methods of production and care of milk and cream on the farm and in the methods of manufacture that would yield the most of the best quality of butter and cheese and therefore return the original producers the most money and the consumers the highest quality of product obtainable. Then the demand would be steady and the remuneration worth the effort. Since 1914, a dairy manufacturing specialist has been employed to assist the creameries with their problems along manufacturing lines.

With approximately 240 dairy plants in the state, it was obvious that one inspector, together with a cheese instructor, who was employed during the summer seasons from 1915 to 1917 inclusive, could not do the work that was demanded. Since the summer of 1917 three inspectors have been employed throughout the year, whereas, at first, the inspection work was confined entirely to the summer season. The powers and duties of the inspectors have likewise increased.

All milk and cream must now be purchased on the basis of a test approved by the Commissioner of Agriculture unless the patrons of such a plant sign an agreement that other methods of purchase will be satisfactory. Operators of the Babcock test must be examined and granted a license

before they are qualified to test. The test apparatus must be examined for accuracy and check tests must be made to insure honesty. With the increase in the amount of milk shipped as fluid milk, the bacterial examination of milk has become very important during the summer season. A considerable amount of ice cream is also being analyzed.

FARM INSPECTIONS.

A casual examination of the work of the Boston Board of Health inspectors in Vermont for the two years ending June 30, 1922, shows that there is a vast amount of educational work necessary on the farms. Acid and sediment tests made by the inspectors of the Department of Agriculture would tend to show that this is true. During the two years, 146 whole milk producers were excluded from shipping fluid milk into Boston. Our inspectors assisted the majority of these producers in improving conditions so they were reinstated in the whole milk market. A few have turned their product into cream and ship it to butter plants. A closer cooperation of creamery managers and receivers in the state in adopting uniform grading standards would tend to reduce the amount of low grade milk and cream that is received.

The following table shows that 137 of the 146 dairies excluded needed a milk house while 126 of them were careless in keeping the stables clean. It is primarily a matter of education to show the reasons for improving the quality of the product and then a matter of time and money to see that they are carried out.

Classified table showing reasons why the 146 dairies were excluded in 1921-1922 from shipping fluid milk to Boston:

	Number Recommended
Build Milk House	137
Clean and whitewash stable	126
Remove manure 50 ft. from stable.....	85
Provide more light	61
Make repairs to stable	55
Put up ice	49
Stop cooling in cattle drinking trough.....	38
Remove other animals from cow stable.....	33
Make a general clean-up.....	32
Provide more ventilation	20
Stop separating in stable	15
Drain barnyard	15

Clean cows	13
Wash milk utensils	7
Keep milker parts out of cattle drinking trough.	4
Use bedding	1

Warm milk absorbs odors very readily, so the stables should be clean at milking time. The milk should be removed from the stable as soon as possible and cooled at once. Milk kept overnight at 70 degrees F will have 200 times more bacteria than if it were kept cooled to 55 degrees. Milk that is properly cooled will not be apt to churn in transit to factory and hence a more accurate butterfat test can be made. Covering milk and cream in transit to factory should be more generally enforced as it is less apt to churn.

In addition to the Boston Board of Health farm inspections, the next table shows that 1,103 farms were inspected by the Department of Agriculture from which milk or cream of an inferior quality was received. Nearly 90% of these farms were inspected a second time to see that previous recommendations were carried out. The plants receiving the product should do more of this farm inspection work. The system of whitewashing stables as done by various plants and charging their patrons at cost has improved stable conditions a great deal. Plants shipping whole milk should not accept milk with a temperature above 60 degrees F, an acidity above .17 percent and bacteria count higher than 500,000 per cubic centimeter.

CARE OF MILK AND CREAM UTENSILS ON THE FARM.

It is safe to say that over 50% of the machine drawn milk contains so many bacteria that it would not pass the standard of the Boards of Health. Milking machines, like other dairy utensils, should be taken apart and washed daily, or they should be so thoroughly washed that they would not need to be taken apart. In the latter case, the milker tubes should be kept in clean cold running water (not in cattle trough), or in a fresh disinfectant solution, so that the few remaining bacteria would not multiply. A saturator brine containing chloride of lime has been found satisfactory in most cases, if changed twice a week in warm weather.

The milk strainer likewise often adds millions of bacteria to milk. Many strainers do not fulfill their purpose of removing visible dirt from milk. Attention is called to the table below which shows from six to eight percent of the milk tested for sediment to be dirty. Outing flannel an-

swers the purpose very well provided it is boiled daily and replaced when necessary. Otherwise it may become a breeding place for bacteria, or it may allow sediment to pass through if it gets thin. A strainer containing a cotton disc which is thrown away after every milking, is usually most satisfactory. Small-top pails should be used for milking as these admit only half the amount of sediment that drops into an open top pail.

The separation of a thicker cream generally would mean decidedly more money for the patrons. Such cream would keep sweet longer and it would reduce losses in the creamery. More skim milk would be retained for feeding purposes and payment would be received for just as much butterfat. The system of paying a premium for high test cream is overcoming this slowly. This idea should be encouraged.

SUMMARY OF INSPECTIONS AND TESTS.

	June 1920- 1921	June 1921- 1922
Number of plant inspections.....	370	347
Number of follow-up plant inspections..	265	236
Number of dairy farm inspections....	592	511
Number of follow-up farm inspections...	473	496
Number of butterfat tests in milk.....	7,735	6,794
Number of butterfat tests in cream.....	4,390	4,828
Number of acid tests in milk.....	3,789	3,653
Number of acid tests in cream.....	4,652	3,427
Number of moisture tests in butter.....	315	467
Number of moisture tests below standard.	36	56
Number of lactometer tests in milk.....	6,696	6,047
Number of lactometer tests below standard	165	59
Number of sediment tests in milk.....	8,146	6,780
Number of sediment tests below standard	492	503
Number of testers' examinations given...	57	61
Number of applicants passing examinations	41	47
Number of applicants failing examinations	16	14

BUYING MILK OR CREAM ACCORDING TO QUALITY.

Many creameries and shipping stations are buying milk and cream according to well established grades. Handling milk that is high in acid or warm increases the handling cost per unit in the plant and therefore the net returns to the patron must be less. A shipment of high

acid milk is occasionally returned, and this means loss to all the patrons. The use of an acid test, thermometer and microscope is particularly desirable for plants shipping fluid milk. Plants that grade their milk have less difficulty in holding their market, and those that grade cream often cater to select trade (usually parcel post) that pays a premium for the butter. One of the common drawbacks to a general grading system seems to be the fact that all plants in any particular locality will not establish grades on the same basis.

USE OF THE MICROSCOPE IN GRADING.

More than a dozen milk shipping stations have purchased microscopes recently, for purposes of bacterial examination of milk and cream. The system of bacterial examination by the Breed method is comparatively simple. A person with little or no training in Bacteriology can usually determine whether a particular sample of milk is good, fair or poor in quality. Several thousand samples have been analyzed within the past year by this department in more than twenty shipping stations. These analyses showed that 12 to 60 percent of the patrons delivered milk with a bacteria count too high to permit shipment as fluid milk. The microscope is particularly useful in that an analysis of a questionable sample can be made within half an hour. It is of great value to locate an infection in the supply and to determine accurately from which dairies the "high count" milk is received.

CONDITION OF DAIRY PLANTS.

In accordance with instructions from the Commissioner of Agriculture all receiving stations, creameries, cheese factories and condensaries are scored at least once annually at the time of a regular inspection. The average score of all plants is much higher than five years ago although a number of plants still score below 750, and a few below 650. Considerable improvement in score has been accomplished by the installation of sanitary piping, providing covers for

DAIRY PLANT SCORES.

Year	Average Score of all plants.
1917	763
1918	777
1919	772
1920	771
1921	782
1922	
(To July 1st)	818

BUTTERFAT TESTING.

I would recommend that Sec. 5935 of the General Laws be changed so that no milk could be purchased on the "pooling plan." The butterfat test is recognized as the most accurate and practical basis of purchasing milk. Individual patrons delivering milk under a pooling agreement do not receive a price for their milk according to its value as fluid milk or as cheese or butter. Five cheese factories, one shipping station and five retailers purchase milk on the pooling plan at the present time.

Several concerns purchasing milk in northern and eastern Vermont have adopted a policy of taking samples for testing, not of each delivery, but occasionally and testing these outside of the state. Samples should be taken of every delivery and tested at least every sixteen days somewhere in the state of Vermont.

Twelve creameries gather cream from the patrons where the product is weighed and sampled at the farm. The collections are combined in barrels or large cans for delivery to the plants. The small daily samples are emptied into composite sample bottles at the plant during the test period. In the majority of cases, the weights and more particularly the quantity of butterfat for a given period, will not check with weights and check samples taken at the plant. The small samples are not entirely emptied into the composite bottles. In many cases, the weighing and sampling is not done properly at the farm. In one particular case, in two months time the patrons on one cream route were paid for 168 pounds less fat than the composite tests showed. This represents five percent of the product handled. I would advise that all weighing and sampling of milk and cream be done at the plant or at some central point.

In order to eliminate many of the complaints on tests, I would recommend that testers be requested to date and

sign every set of butterfat tests on which a payment is based and state the period which such test covers as well as the patrons' names or numbers. This test record sheet should be kept on file in the plant for purposes of inspection for at least one year. If testing is not done daily, the composite samples should be kept in good condition for at least three days after tests are made. This would permit inspectors to retest the same samples after tests had been made in the plant. I believe in a short time this would enable us to eliminate nearly all complaints on tests.

Daily testing of cream should be required by law, to take effect at some future date. This would encourage the production of a higher quality of cream. Curdy, churned or frozen cream should not be tested. When deliveries of cream in this condition are received, the patron should be advised that no test was made, and the reason. A fresh daily sample can be tested more accurately than a composite sample that is preserved under average conditions. Moreover, samples are not taken ordinarily of each delivery nor in proportion to the amount delivered so that the composite test does not represent the true percentage of all the cream delivered for the period. Daily testing of cream would aid in a daily check on the fat loss and the overrun, and the advantages would more than counterbalance the extra cost of testing. The table below shows the trend from composite to daily testing in the last six years.

TESTING MILK AND CREAM IN PLANTS.

1916				1922				
	Daily	15 or 30 day Composite	Pooling Plan		Daily	7 day Composite	15 day Composite	Pooling Plan
Milk	3	75	25		1	9	42	11
Cream	11	125	..		43	6	51	..
Milk and Cream	2	10	..		9	3	68	..
Total	16	210	25		53	18	161	11

VIOLATIONS.

Violations are, for the most part, careless and unintentional. This holds true in the case of adulterated butter and ice cream more than with milk or cream. Approxi-

mately 50% of the ice cream and 12% of the butter analyzed is below the legal standard. I believe these manufacturers should be prosecuted on the second offence after receiving a warning in writing.

Less than 2% of the 12,743 samples of milk analyzed for solids showed adulteration. During the calendar year 1920, twenty-seven cases of adulterated milk were reported for prosecution, in 1921 fifty-nine cases were reported, while in 1922 up to July 1 no cases had been reported.

REPORT OF H. E. BREMER**SUPERVISOR OF COW TESTING ASSOCIATIONS AND CREAMERY
INSPECTION.**

INTRODUCTION.

During the biennial period ending June 30, 1922, the number of cow testing associations in Vermont increased from eighteen to twenty-one. Thirteen of the eighteen were still operating in 1922 that were active in 1920 and three of the five defunct associations completed the full testing year before discontinuing the work. Eight new associations in six different counties were organized during this period. These cover, for the most part, sections of the state that have once had an association and where the initiative for reorganization came from the dairymen themselves. Twenty-seven testers have been put in charge of associations during this biennial period.

TESTERS' RECORDS AND REPORTS.

In 1920 the form of herd book was changed so that the record of any cow on test, whether in milk or dry, would be complete and totaled to date any month in the year. This change has eliminated the duplicate record of all cows in another ledger and has given the testers sufficient time to keep all records up to date. This was hardly possible formerly when large herds were tested and the drive to the next member was long. This change has also made it possible to get practically all totals of production along with costs and values for each individual cow in each association. The pounds of the various feeds consumed by each cow as well as production, and other factors are now reported for each individual cow only at the end of the year. These records on individual cardboard strips can be grouped easily for tabulating various factors relative to age, breed, amount of feeds consumed, etc., as they relate to profits obtained. These records are now coming into the office of the Department of Agriculture and will be tabulated when there is sufficient volume to make suitable comparisons.

The testers report the list of cows on the honor roll (cows producing either 40 pounds butterfat or 1,000 pounds of milk in 30.5 days) each month to the various local papers. They also mail the barn records to the Department of Agri-

culture each month so that a check can be made on the progress of their work. This latter factor has gone a long way toward having all herd books complete.

Annual reports are usually made at the end of each association year covering the production per cow in each herd as well as the grand average for the entire association. (See tables 1 and 2).

THE VALUE OF MAN LABOR.

Too few dairymen, even though they are members in a cow testing association, realize or figure what they get for an hour's work in dairy farming. The cow testing association furnishes us a fairly reliable estimate of the feed cost of the average cow in the association. Surveys covering many farms in different localities have given us an idea as to the time applied in milking, feeding, hauling feed, the amount of bedding used and other factors as related to other costs of keeping a cow.

An approximate average cost (exclusive of feed and man labor) of keeping a cow a year follows:

Man labor, 158 hrs. at.....	?
Horse labor, 8 hrs. at 25c.....	\$2.00
Depreciation 12% on \$80.00 cow.....	9.60
Interest 6% on \$80.00 cow.....	4.80
Bedding	1.86
Use of buildings	8.25
Use of equipment	1.29
Bull service	2.13
Interest on roughages and grain inventory.....	1.44
Miscellaneous costs (Vets' fees, cow test dues, etc.)	5.57

Total \$36.94

CREDITS.

Manure	\$9.00
Calf	5.00
Feed Bags returned	1.20

\$15.20 \$15.20

Net cost, exclusive of man labor, feed and hauling \$21.74

Figuring feed at cost, hauling at 20c cwt. and using the above figure of \$21.74 as the overhead cost of keeping a cow, the highest producing dairy in one association in 1921-'22 returned its owner 18c an hour for man labor while the lowest returned 2 1-2c and the average member received tire dairy must be replaced about that often. Many cows at the end of this period should naturally go for beef while

12c an hour for his labor. To which class do you belong? What are you getting an hour?

Tables 1 and 2 list the averages of the different associations for the two fiscal years in this biennial period. Production varies widely in these different sections but it is very noticeable that it is highest in those sections that have been in associations a long time or that have introduced a large percentage of high grade and pure-bred stock.

A comparison of Tables 1 and 2 shows an increased production from 1921 to 1922. The increased product in 1921-'22 brought considerably less on the market, however, than a less amount the year previous, but the decrease in the value of the product was not attended by an equal decrease in feed costs. Hence in most of the associations, the herds showed less gain than in former years. The price of roughages and particularly the price of mixed cow feeds has been so high that when the relative prices of milk were considered, more farmers have produced milk at a loss than in former years. Compare for instance the Cabot Association for the two years in these tables. The cows were fed more roughages and grain in 1921-'22 than the previous year. Production was increased but the value of the increased product was less and the net gains were less, due not only to the drop in milk prices but also to the relatively high feed costs. The value of a cow test record or a cost of production record is greater to-day than in years just past.

CONCLUSION.

The Cow Testing Association, by means of the scales and Babcock test, has demonstrated the comparative value of different cows. Considering the average period of usefulness of a dairy cow as hardly more than six years, the few may be retained primarily for breeding purposes. The association, to really fulfill its purpose, should show its members not only the individuals to be led to the block but also how good cows come to be,—how they inherited the dairy qualities and how these were brought out by proper feeding and regular care.

Proper feeding and regular care should begin with the calf. A scanty ration means a lack of development. This is particularly true when a cow is dry and carrying a calf. A pound of grain then is worth two pounds later. The cost of milk production is not decreased any more than the returns for an hour's labor is increased by allowing dairy cattle to endure discomforts. Fall storms or cold stables should be avoided. Ill treatment should be replaced by kindness. All tend to raise the production and increase the period of usefulness.

Table I.

Association Averages, Year Ending June 30, 1921.

Association	Year Ending	No. of herds	No. of Cows	Aver. Lbs. Milk	Aver. lbs. B. F.	Value of Product Per Cow	Feed Per Cow		Grain Per Cow		Total Feed Cost Per Cow	
							Hay	Silage	Grain	Roughage	Cost Per Cow	Per Cow
Rutland County	July 1920	20	633	5,041	213.9	\$176.25	.....	.....	.....	\$56.77	\$48.55	\$105.32
No. Chittenden	Sept. 1920	21	439	5,252	214.2	184.64	.....	.....	.....	53.53	45.36	98.89
Eastern Caledonia	Oct. 1920	24	370	4,709	189.7	164.49	.....	.....	.....	47.81	54.18	101.99
Champlain Valley	Nov. 1920	26	551	4,902	192.2	157.05	.....	.....	.....	53.40	28.24	81.64
Cabot	Nov. 1920	25	501	4,456	199.4	160.13	2,554	1,000	1,131	36.61	39.34	75.95
Craftsbury	Dec. 1920	17	379	4,554	225.9	162.83	.....	.....	.....	37.00	34.18	71.18
Ascutney	Dec. 1920	18	321	4,990	231.1	184.27	.....	.....	.....	49.55	58.48	108.03
White River	Dec. 1920	16	384	5,446	285.5	210.83	.....	.....	.....	39.34	63.41	102.75
St. Albans	Dec. 1920	19	469	5,274	223.9	171.69	.....	.....	.....	44.21	36.71	80.92
Enosburg	Jan. 1921	24	587	4,943	235.2	155.23	.....	.....	.....	33.95	41.83	75.78
Waterbury-Waitsfield	Jan. 1921	24	476	5,396	221.3	187.94	2,977	3,978	1,241	54.76	42.34	97.10
Randolph	March 1921	25	508	4,748	219.4	168.51	.....	.....	.....	54.19	42.13	96.32
Washington County	June 1921	21	402	5,746	245.5	181.98	2,596	4,803	1,674	54.44	47.58	102.02
White River	June 1921	13	240	5,643	283.7	181.68	.....	.....	.....	36.65	46.64	83.29
Grand Isle	June 1921	27	394	5,882	232.1	169.19	2,363	5,715	718	65.46	17.41	82.87
Grand Total,		320	6,654	5,099	224.4	172.86	2,633	3,707	1,192	48.19	42.46	90.65
Grand Average							Average of 1,773 cows					

Table II.
ASSOCIATION AVERAGES
Year ending June 30, 1922.

Association	Year Ending	No. of herds	No. of Cows	Aver- age lbs. B. F.	Per Cow	Value of Product		Hay	Silage	Grain	Rough- age	Grain		Total Feed Cost	Gain Per Cow
						Per Cow	Per Cow					Per Cow	Per Cow		
Rutland County	July 1921	21	667	4,881	216.0	\$144.68	.....	.....	.....	.....	\$57.70	\$36.22	\$93.92	\$50.76
North Chittenden	Sept. 1921	23	549	5,161	207.6	133.61	.....	.....	.....	.....	42.77	28.18	70.95	62.66
Central Orange County	Oct. 1921	22	295	5,161	253.5	139.94	.....	.....	.....	.....	39.37	43.58	82.95	56.99
Cabot	Nov. 1921	26	467	5,034	243.8	138.91	3,295	2,404	1,644	.....	42.24	37.38	79.62	59.29
Champlain Valley	Dec. 1921	21	420	5,608	220.6	142.48	.....	.....	.....	.....	43.35	30.06	73.41	69.07
Acutney	Dec. 1921	8	165	6,534	315.4	206.35	.....	.....	.....	.....	50.80	54.85	105.65	100.70
Craftsbury*	Dec. 1921														
No. Eastern Caledonia	Jan. 1922	19	363	5,331	220.1	118.35	3,046	2,373	1,680	.....	44.77	33.96	78.73	39.62
Bennington County	Feb. 1922	23	561	5,272	214.4	134.36	1,834	4,257	1,411	.....	37.78	27.24	65.02	69.34
Waterbury-Waitsfield	Feb. 1922	16	390	5,911	239.7	156.05	2,916	5,471	1,650	.....	50.16	34.21	84.37	71.68
Central Lamolle County	March 1922	27	553	4,314	198.6	91.13	2,257	4,660	1,192	.....	43.78	23.89	67.67	23.46
Randolph	March 1922	22	438	5,777	256.6	153.01	2,299	5,840	1,812	.....	47.62	37.12	84.74	68.27
Washington County	June 1922	21	453	6,246	263.6	156.55	2,678	7,332	2,020	.....	57.57	38.61	96.18	60.37
White River	June 1922	12	287	6,128	307.4	160.96	.....	.....	.....	.....	42.82	50.54	93.36	67.60
Peacham-Ryegate	June 1922	24	492	5,313	251.4	124.72	3,040	3,941	1,576	.....	44.43	30.24	74.67	50.05
Granite Heights	June 1922	20	317	5,341	234.4	127.83	2,821	4,332	1,621	.....	42.92	33.62	76.54	51.29
Grand Isle	June 1922	25	364	5,497	213.6	120.24	1,277	7,641	976	.....	50.11	19.49	69.60	50.64
Grand Average		330	6,781	5,369	234.6	135.59	2,531	4,780	1,550	.....	46.32	33.43	79.75	55.84
							(Av. of. 4,398 cows)								

*Records Incomplete.

ACTIVE ASSOCIATIONS

July 1, 1921.

Association	Year Organized	No. of Herds	No. of Cows	Tester	Address
Ascutney	1919	20	360	Orville Wilder	Hartland, Vt.
Bennington Co.	1921	24	506	P. H. Walters	W. Rupert, Vt.
Cabot	1915	26	476	E. W. Sargent	Cabot, Vt.
Central Lamoille Co.	1921	26	533	E. P. Welch	Morrisville, Vt.
Central Orange Co.	1920	28	409	W. A. Renfrew	Chelsea, Vt.
Champlain Valley	1913	31	690	L. P. Emmerick	Vergennes, Vt.
Craftsbury	1911	24	481	Roger Hutchins	No. Craftsbury, Vt.
Grand Isle Co.	1920	28	432	L. D. Smith	No. Hero, Vt.
Granite Heights	1921	18	350	B. C. Coburn	Williamstown, Vt.
North Chittenden	1910	25	515	W. C. Arms	Burlington, Vt.
Northeastern Caledonia	1921	25	472	J. P. Callendar	St. Johnsbury, Vt.
Peacham-Ryegate	1921	27	400	Virgil Shields	Peacham
Randolph	1910	22	427	Walter Wheatley	Randolph Center, Vt.
Rutland	1910	21	656	W. D. Walden	Pittsford, Vt.
Washington Co.	1915	25	522	E. M. Maxham	Worcester, Vt.
Waterbury-Waitsfield -	1909	20	499	P. E. Bassett	Waterbury, Vt.
White River	1908	17	425	Walter Parsons	Quechee, Vt.
Total.....		407 herds	8,103 cows		

ACTIVE ASSOCIATIONS

July 1, 1922

Association	Year Organized	No. of Herds	No. of Cows	Tester	Address
Ascutney	1919	19	401	Orville Wilder	Hartland, Vt.
Bennington Co.	1921	21	452	P. H. Walters	W. Rupert, Vt.
Cabot	1915	26	472	E. W. Sargent	Cabot, Vt.
Central Lamoille Co.	1921	25	517	R. C. Jones	Morrisville, Vt.
Central Orange Co.	1920	25	361	W. A. Renfrew	Chelsea, Vt.
Champlain Valley	1913	20	455	Ivan Moulton	Vergennes, Vt.
Craftsbury	1911	19	354	Gordon Oakes	No. Craftsbury, Vt.
Enosburg	1910	22	551	L. H. Davis	Enosburgh Falls, Vt.
First Addison	1911	25	428	L. R. Duffany	Middlebury, Vt.
Grand Isle Co.	1920	27	375	L. D. Smith	Grand Isle, Vt.
Granite Heights	1921	24	389	B. C. Coburn	Williamstown, Vt.
Lamoille Valley	1910	24	456	Fred Lewis	East Hardwick, Vt.
North Chittenden	1910	25	655	W. C. Arms	Burlington, Vt.
Northeastern Caledonia	1921	26	470	J. P. Callendar	St. Johnsbury, Vt.
Orwell	1917	27	597	Frank Hoag	Orwell, Vt.
Peacham-Ryegate	1921	26	550	Virgil Shields	Peacham, Vt.
Randolph	1910	21	422	H. L. Aiken	Randolph, Vt.
Rutland	1910	21	662	F. A. Cassidy	Pittsford, Vt.
Washington Co.	1915	22	485	Stanley Curtis	Montpelier, Vt.
Waterbury-Waitsfield	1909	21	493	C. W. Monroe	Waterbury, Vt.
White River	1908	18	459	Walter Parsons	Quechee, Vt.
Total		484	10,004		

REPORT OF THE LIVE STOCK COMMISSIONER.**E. S. BRIGHAM**

The duties of the live stock commissioner as defined by law remain unchanged and as summarized in my previous reports are as follows:

1. Regulation of live stock imports from other states and countries, so that the live stock of Vermont may not be infected by the importation of diseased animals.

2. The control of contagious diseases which are dangerous to live stock.

3. The supervision of tuberculin tests of cattle made for shipment out of the state, the inspection of animals slaughtered for food and believed to be tuberculous, and the eradication of tuberculosis from our herds.

The following report will cover the activities of the department along the above lines and some suggestions growing out of experience will be made regarding some changes believed to be necessary.

1. REGULATION OF LIVE STOCK IMPORTS.

The law relating to the importation of live stock and the regulations made in accordance with the law are substantially the same as in the preceding biennium. During the period covered by this report 1,469 permits were issued for the importation of cattle and horses into the state. A detailed report follows, showing the origin of the importations and the results of examination.

During this period, under date of May 13, 1921, our regulation requiring a 60-day retest of all cattle imported except those coming from officially tuberculosis-free accredited herds, was further amended by allowing the release of imported cattle upon the receipt of evidence that they came from herds under state and federal supervision that had passed one free test without reactors. It is not the desire of the agricultural department to place any unnecessary handicap upon the movement of live stock into the state and it was believed that owing to the great progress made in bovine tuberculosis eradication in other states, the

amendment could be made without risk of admitting tuberculous animals into Vermont.

Section 1 of No. 19 of the Acts of 1921 provided for the use from the regular appropriation of a sum not to exceed \$1,500 for the employment of assistants to investigate infringements of the live stock importation laws. As a result of the work of such assistants during the fiscal year ending June 30, 1922, 29 cases of violation of law have been discovered and reported to the state's attorneys of the counties where the violations occurred.

RECORD OF CATTLE AND HORSES IMPORTED INTO VERMONT. 1922

July 1, 1917 to
June 30, 1922

	New Hampshire	Massachusetts	Connecticut	Maine	Rhode Island	New York	Canada	Other States	Total 1922	Total 1921	Total 1920	Total 1919	Total 1918
<i>Note</i> —On May 13, 1921, regulations amended to allow release without retest of cattle coming from herds under State and Federal supervision that have passed one clean test without reactors.													
CATTLE													
HELD FOR 60 DAY RETEST													
Tested and passed	112	106	20	18	1	271	33	24	585	639	764	1096	2080
Tested and condemned	3	4	0	3	0	23	1	0	34	31	64	5	6
Died, killed, or reshipped before test	10	1	0	0	0	46	3	1	61	57	37	0	0
From Accredited Herds not held for test	27	62	1	10	0	1	3	19	123	31	7	0	0
From herds once tested without reactors, not held for retest	41	14	2	1	0	31	0	1	90	13	0	71	131
Imported for Immediate Slaughter	49	4	0	0	0	9	68	0	130	283	72	63	46
Imported for Immediate Shipment	162	3	0	0	0	639	11	0	815	193	242	305	371
Imported for Exhibition-Breeding	14	0	41	0	0	10	0	1	66	99	172	42	2
Imported for Public Sale and re-shipped out of Vermont	60	26	14	76	0	43	0	5	224	118	156	400	256
Vermont cattle returning—no test	75	76	0	0	0	25	0	0	176	20	105	0	48
Total Cattle	553	296	78	108	1	1098	119	51	2304	1484	1619	1982	2940
HORSES													
Mallein tested and passed	13	246	1	0	0	260	3	0	523	871	870	1238	1274
Physically examined and passed	146	172	5	4	1	144	260	572	1304	1849	2157	2408	3179
Tested and condemned	0	0	0	0	0	0	0	0	0	1	0	0	0
Imported for exhibition	0	1	7	0	0	0	0	0	9	97	27	0	0
Vermont horses returning—no test	2	6	0	0	0	19	0	0	27	5	2	0	34
Imported for short stay—reshipped	5	1	0	0	0	0	20	0	26	2	28	6	18
Total Horses	166	426	13	4	1	424	283	572	1889	2825	3084	3652	4505

Regulation requiring cattle to be held in quarantine at destination for 60-day retest went into effect May 1, 1919. Previous to that cattle were released on satisfactory certificates of test in state of origin.

RECOMMENDATIONS

It is my opinion that the laws and the regulations made pursuant thereto are sufficient, if rigidly enforced, to properly protect the state against the importation of diseased animals. I recommend that the regulation requiring the 60-day retest of cattle coming into the state be retained. If the state of Vermont is to continue its policy of eradicating tuberculosis from its cattle, the greatest vigilance must be exercised to prevent the importation of tuberculous animals. In my opinion the 60-day retest is the only measure which will insure adequate protection.

Attention is called to the fact that no horses were found infected with glanders in Vermont in 1922. This may be in a measure attributed to the rigid permit system and examination which has made it impossible to market glandered horses in Vermont.

While the expenditure of a sum larger than \$1,500.00 would insure much better border policing, yet it is my opinion that this will prevent illegal importations, providing that our law-enforcing officers will promptly prosecute all offenders.

2. CONTROL OF OUTBREAKS OF DANGEROUS CONTAGIOUS DISEASES.

There have been no serious outbreaks of dangerous contagious diseases among the live stock of the state during the period covered by this report, although there have been some of minor importance.

ANTHRAX:—An authenticated report was received of an outbreak of anthrax in the town of Bethel. The infection seemed to trace to tannery wastes discharged into a stream which overflowed adjacent lands in time of high water. Only one animal died and no further trouble has been experienced. The department has followed its usual policy of furnishing vaccine to owners where outbreaks have occurred and the owners have paid for vaccination.

HEMORRHAGIC SEPTICEMIA:—Frequent reports of outbreaks of this disease have been received but losses have not been numerous. Many owners who have in the past suffered losses from this disease now follow the policy of vaccinating their herds with serum before turning out in the spring and good results seem to follow this policy.

BLACKLEG:—Some reports were received of losses from this disease but they have not been serious. The U. S. Bureau of Animal Industry, through failure of Congress to

make an appropriation for the purpose, has discontinued furnishing free vaccine for the protection of animals against blackleg and the state department is no longer able to pass this material on to the people of the state. Henceforth owners will have to vaccinate their cattle against this disease at their own expense.

HOG CHOLERA:—Small outbreaks of this disease occurred in Washington and Chittenden Counties. One case was traceable to hogs imported from out of the state and another to the feeding of unsterilized hotel garbage. Hog cholera serum has been purchased by the department and sold to owners at cost.

GLANDERS:—But four horses were condemned as having glanders in the fiscal year ending June 30, 1921. During the last fiscal year no cases of glanders were found and the state for the first time since 1895 paid no indemnity for glandered horses. Strict supervision of the importation of horses under the permit system has made it difficult for unscrupulous dealers to market glandered horses in Vermont.

VETERINARY PATHOLOGIST NEEDED.

Recommendations were made in my last report that provision be made for the employment of a veterinary pathologist to be located at the State Laboratory of Hygiene where he would be prepared to examine tissues of animals which die of unknown causes. Now such tissues have to be forwarded to Washington and several days are required before a reply is received. In the case of an outbreak of a dangerous contagious disease a prompt laboratory examination of tissues to confirm diagnosis might be the means of preventing the spread of a disease which would destroy thousands of dollars' worth of live stock. If the present law providing for the payment of indemnity for animals slaughtered for human consumption and found tuberculous remains in force, the tissues of such animals should be subject to laboratory examination to confirm the diagnosis of the inspector. In sections of the state where good veterinary service is not available and inspection at a reasonable expense difficult to obtain, I am convinced that claims are paid for diseased animals which may not have tuberculosis, but some other disease. A laboratory examination of the diseased tissue would save this expense. Again, our cattle owners are suffering heavy losses from contagious abortion and it is probable that testing for this disease may become more common in the future. A veterinary pathologist could

prepare materials for making such tests so that they would be available to the people of the state. An appropriation of \$5,000 would probably be necessary to pay the salary of a competent pathologist and provide the necessary laboratory equipment.

3. BOVINE TUBERCULOSIS WORK.

Under the law this department is called upon to do four classes of work in connection with bovine tuberculosis:

1st. Private tests made by veterinarians working under the authority of the Commissioner of Agriculture and paid for by the owner.

2d. Tests of cattle for shipment out of the state, which are made in the same way and also paid for by the owner or the shipper.

3d. Tests made by the state and federal governments, which, during the past fiscal years, have been made by veterinarians employed on full time by the state or federal governments.

4th. The examination of animals slaughtered for human consumption and suspected of having tuberculosis.

1. PRIVATE TESTS.—These tests are made under Sec. 499 General Laws as amended by Sec. 3, No. 18, Acts of 1919. They are made at the expense of the owner, who is held responsible for reporting them to the commissioner within five days after completion. If these tests are made by an approved veterinarian, and reacting cattle found are slaughtered, regular indemnity is paid by the state providing the owner of the cattle or those who have owned them within ninety days will submit their herds under Sec. 500 as amended.

2. SHIPPER'S TESTS.—These tests are made under Sec. 499 General Laws as amended and under Sec. 509 as amended by Sec. 7, No. 18, Acts of 1919. Since July 1, 1919, the U. S. Bureau of Animal Industry, U. S. Department of Agriculture, has taken jurisdiction over the interstate shipment of live stock. No cattle may now move interstate except for immediate slaughter or for feeding or grazing purposes unless and until they have been subjected to a tuberculin test made in the state of origin by a veterinarian authorized by the state and approved by the U. S. Bureau of Animal Industry to apply the test. Charts covering such tests are forwarded by the authorized veterinarians to the live stock commissioner for approval.

The following table shows the number of tests made privately and for interstate shipment during the period covered by this report:

RECORD OF CATTLE TESTED

rted Tested at Private Tests:
 shipment Out of Vermont:
 le tested for shipment
 tested for shipment
 r Cattle Tested for Shipment
 title Condemned at Tests for Shipment
 ge of purebreds condemned
 condemned at tests for shipment
 ge of grades condemned
 r Cattle Condemned at Tests for Shipment
 ge of cattle condemned at Tests for Shipment

e Tests:
 le tested
 :ested

r of Cattle tested "Other Private Tests"

:tle condemned at "other private tests"
 ge of purebreds condemned
 :ondemned at "other private tetss"
 ge of grades condemned
 nned and held under Sec. 505
 r Cattle Condemned "Other Private Tests"
 ge condemned

1917	1918	1919	1920	1921	1922
			647	347	198
5,630	5,038	4,346	8,341	7,108	8,080
			8,988	7,455	8,278
			20	12	1
			3.0%	3.4%	0.5%
			275	127	159
			3.2%	1.7%	1.9%
153	122	105	295	139	160
2.7%	2.4%	2.4%	3.2%	1.8%	1.9%
			1,592	905	752
			5,295	5,479	7,585
3,287	3,666	3,446	6,887	6,384	8,337
			249	132	28
			15.6%	14.5%	3.7%
			693	531	696
			13.0%	9.7%	9.1%
		2	27	8	14
207	270	457	969	663	724
6.2%	7.3%	3.2%	14.0%	10.3%	8.6%

RECORD OF CATTLE TESTED.

of all Private Tests:

attle tested
le tested

iber of Cattle Tested at Private Tests

attle condemned at private tests

le condemned at private tests

lenmed and held under Sec. 505

iber of Cattle Condemned at Private Tests

of cattle condemned at private tests

private tests killed and found diseased

private tests killed—no lesions found

1917	1918	1919	1920	1921	1922
			2,239	1,252	950
8,917	8,704	7,792	13,636	12,587	15,665
			15,875	13,839	16,615
			269	144	29
			968	658	855
		2	27	8	16
360	392	562	1,264	802	884
4.0%	4.0%	7.2%	7.9%	5.8%	5.3%
			22	7	3
			2	1	2

RECORD OF CATTLE TESTED.

July 1, 1917 to June 30, 1922.

	1917	1918	1919	1920	1921	1922
				2,051	2,835	3,812
				9,769 26,972	12,724 39,967	14,261 49,682
	5,716	7,556	14,384	36,741	52,691	63,953
			286	767 7.8%	530 4.1%	882 6.1%
			940	2,273 8.4%	2,093 5.2%	4,080 8.2%
			68	13	11	8
	437 7.6%	1,072 14.1%	1,294 8.9%	3,053 8.3%	2,634 4.9%	4,962 7.7%
				120 3	17 1	8 9
				123	18	17

and Federal Cooperative Tests and Cattle Tested under Agreement
Sec. 500 as amended by Sec. 4 No. 18, Acts of 1919 and Sec. 1 No. 18, Acts
of 1921

er of lots or herds tested

purebred cattle tested
grade cattle tested

Number Cattle Tested Under Agreement

red cattle condemned at cooperative tests

percentage of purebreds condemned

cattle condemned at cooperative tests

percentage of grades condemned

condemned and held under Sec. 505

Number of Cattle Condemned at Cooperative Tests

percentage condemned at cooperative tests

ects" at cooperative tests killed—found diseased

ects" at cooperative tests killed—no lesions found

Number of Suspects Killed—Cooperative Tests

SUMMARY OF EXPENDITURES FOR COOPERATIVE CLAIMS AND TESTING

Sec. 500 General Laws as amended

	*1918	1919	1920	1921	1922	Total
<i>demnity</i>						
Cattle condemned, Coop. tests	\$ 48,344.39	\$ 48,221.85	\$ 122,309.74	\$ 108,097.95	\$ 85,567.74	\$ 412,541
ite Veterinarians	2,780.46	3,836.01	9,610.45	14,510.00	16,119.52	46,856
pt. Expense, Prop'n. for coop. tests	998.20	1,888.64	3,853.65	5,310.30	7,535.31	19,586
tal expended	\$ 52,123.05	53,946.05	135,773.84	127,918.25	109,222.57	478,98
imated salvage received	18,931.52	24,534.24	42,930.25	20,484.09		106,88
	\$ 33,191.53	29,412.26	92,843.59	107,434.16	109,222.57	\$ 372,10
						This is cos
						State of t
						culosis era
						tion u n c
						present accr
						ed herds 1

*Dates cover fiscal year ending June 30 of year named.

RESULTS OF WORK UNDER ACCREDITED HERD PLAN.

The following table shows the number of herds and the number of cattle under supervision in accordance with the accredited herd plan, as of June 30, 1922:

	Herds.	Cattle.
Accredited Herds	1,063	18,843
One Clean Test	2,298	31,371
With Reactors	796	19,568
<hr/>		<hr/>
Total number herds under supervision	4,157	69,782

The accredited herds referred to in the above table have passed two or more tuberculin tests without reactors. The herds referred to as having one clean test have passed one tuberculin test without reactors. Those designated as having reactors had reactors at the last test. The expense for indemnity for cattle which may react in the future to tests made in accredited and one clean test herds will be small; some reactors will be found in future tests of herds having reactors at the last test, but the heaviest expense has been incurred. Under our laws accredited herd owners are expected to pay the expense of testing after the herd is once accredited. The only expense to the state in connection with accredited herds, except as reactors may in rare instances outcrop, will be in office work in supervising tests, records, et cetera.

INDEMNITY.

Our method of computing indemnity was materially changed by Sec. 2 of No. 20 of the Acts of 1921. Before the passage of this act grade animals were appraised at their value up to a limit of \$100 and purebreds up to a limit of \$150. The owner was paid 75% of the appraised value as indemnity. The salvage received from condemned animals became the property of the state. In the case of accredited herd tests, the federal government participated in paying the indemnity but the sum contributed by the federal government was deducted from the sum to which the owner was entitled under the laws of the state. Since the federal government did not participate in the payment of indemnity for cattle condemned as a result of private or shipper's tests, the state was compelled to pay the entire indemnity

for private tests and a large percentage of its appropriation was used in paying such indemnities.

The new law provides that the salvage received from condemned animals should go to the owner instead of into the state treasury and provides that the state should pay as indemnity one-third the difference between the salvage and the appraised value with a limit of payment of \$25 for a grade animal and \$50 for a purebred animal, and this without deductions of like sums paid by the federal government. The practical result has been to confine private test indemnities to the sum which would have been paid by the state if the herd had been tested under the accredited herd plan. This has discouraged private testing, and materially reduced the indemnities paid by the state for such tests. This has not shown up materially in the accounts because of old private test liabilities which have become due when the entire herd was tested under the accredited herd plan, but the effect will appear in the next fiscal year.

The following table shows the average received by owners of condemned animals:

Average Received by Owners.	1921.	1922.
Average total indemnity.....	\$73.49	\$46.33
Average net salvage.....		10.66
Total	<u>\$73.49</u>	<u>\$56.99</u>

DISPOSAL OF CONDEMNED ANIMALS.

The law relating to the disposal of condemned animals was materially changed by Sec. 1 of No. 20 of the Acts of 1921. Heretofore such animals were required by law to be disposed of within the state of Vermont at any slaughter house where all animals slaughtered are inspected and passed upon by an agent or official of, and according to the regulations of the bureau of animal industry of the U. S. department of agriculture. There was only one plant in the state, located at Burlington, which had government inspection and also facilities for handling the number of cattle condemned in the state. It was manifestly an uneconomic procedure to ship cattle from southern and eastern Vermont to Burlington, particularly since the shipments coming over the Central Vermont Railway into Burlington were assessed a switching charge of \$5.00 per car for placing at the plant of the Burlington Rendering Company.

The law was amended so that condemned cattle could be shipped to any slaughter house, either within or without

the state, where federal inspection was maintained and the commissioner was authorized to license slaughter houses to handle such cattle. Furthermore the commissioner was given authority to license dealers to handle such condemned cattle from the loading station of the owner on to the licensed slaughter houses. In many cases small lots of cattle are condemned and if these must be shipped by themselves the shipment would be subjected to an excessive freight charge per animal. In most sections of the state live stock trains are run weekly carrying beef cattle collected from station to station on to slaughter houses for slaughter. By making it possible to ship condemned cattle with these beef animals a considerable savings in freight could be effected.

Since the indemnity paid by the state and federal governments is conditioned upon the amount of salvage received by the owner for the condemned animal, the department has an interest in seeing that the condemned animals are marketed as inexpensively and efficiently as possible. In reckoning the charges which dealers were permitted to make investigation was made of the actual expenses incurred in shipping several lots of cattle from Vermont points to the Boston market and a maximum charge was fixed, varying with the freight rate, so that on the average the dealer would net about 80c per head margin over expenses in making the shipment. The owner could make arrangements with a dealer to act as his agent in the shipment of condemned cattle at a less figure than that fixed, but not at a greater figure. The owner, furthermore, could ship his condemned cattle independently of any dealer direct to a licensed slaughter house. This arrangement has worked out with evident satisfaction to all parties concerned. The following table shows a summary of the transactions with the various licensed slaughter houses during the year ending June 30, 1922:

SUMMARY OF REPORTS SHOWING PROCEEDS DERIVED BY OWNERS FROM THE SALE OF REACTORS.

June 1, 1921, to June 30, 1922.

	Burlington Rend. Co. Yr. ending June 30-1922	N. E. D. M. & W. Co.	Cheshire Beef and Prod. Co.	John Miner Hyde Park	T. J. Kelley & Co.	Haverhill Abattoir Co.	Total All Abat- toirs
Net amount paid owners	\$ 11,427.82	\$49,462.85	\$1,462.67	\$ 921.26	\$2,839.80	\$ 501.93	\$68,616.33
Deduction for freight, commission, etc.	4,938.73	30,981.45	522.79	285.05	2,801.19	517.18	40,019.39
Gross Salvage	16,366.55	80,444.30	1,985.46	1,179.31	5,640.99	1,019.11	106,635.72
No. head passed for beef	838	3,686	115	95	351	55	5,140
No. head tanked	134	280	7	29	28	3	491
Total No. slaughtered	972	3,976	122	124	379	58	5,631
Percent tanked	13.7	7.2	5.7	23.0	7.3	5.1	8.7
Average live weight	749 lbs.	720 lbs.	341 lbs.	283 lbs.	286 lbs.	311 lbs.	312 lbs.
Average dressed weight	259 lbs.	327 lbs.	341 lbs.	283 lbs.	286 lbs.	311 lbs.	312 lbs.
Percent shrinkage	65%	54%	.....	.....	.....	.....	.....
Average shrinkage per head	490 lbs.	393 lbs.	.....	.....	.....	.....	.....
Average price paid per pound for beef	6.6 c.	5.8 c.	4.4 c.	3.4 c.	4.7 c.	5.2 c.	5.8 c.
Average hide weight	34.2 lbs.	42.5 lbs.	47.2 lbs.	42.2 lbs.	44.4 lbs.	40.1 lbs.	41.3 lbs.
Average price paid per pound for hides	5.3 c.	5.1 c.	4.3 c.	5.0 c.	4.7 c.	4.8 c.	5.1 c.
Average price paid per pound for tannage	.....	1/4 c.	.....	.....	1/4 c.	.....	1/4 c.
Average price paid per pound for tallow	2.3 c.	2.4 c.	.....	.....	1.6 c.	.....	2.3 c.
Average gross receipts per animal	16.83	\$ 20.23	\$ 16.27	\$ 9.51	\$ 14.88	\$ 17.57	\$ 18.93
Average deductions for freight, et cetera	5.08	7.79	4.28	2.08	7.39	8.91	7.10
Average net receipts per animal	11.75	12.44	11.98	7.42	7.49	8.66	11.83

The average net salvage received from the Burlington Rendering Company under the old method for the year ending June 30, 1921 was \$8.91 per animal.

The following is a copy of the license issued to dealers :

DEALER'S LICENSE TO HANDLE CATTLE CONDEMNED AS TUBERCULOUS.

By virtue of the provisions of Sec. 506 of the General Laws of the State of Vermont, as amended by Sec. 1, No. 20 of the Acts of 1921, of hereinafter referred to as the licensee, is hereby given a license for a period of one year from date to handle cattle condemned as tuberculous in accordance with the terms of said act and the following regulations, which have been duly approved by the Governor:

1. The licensee shall receive at public loading yards located on the line of railroad where he conducts a regular business in handling live stock, cattle condemned as tuberculous which by previous arrangement, may be offered to him by owners who have received a permit from the commissioner of agriculture to dispose of such cattle.

2. The licensee shall at all times keep such condemned cattle away from healthy cattle in the public loading yard before loading and shall not ship such condemned cattle or transport them in cars or in any other conveyance containing healthy cattle or hogs except such as are consigned for immediate slaughter, unless such condemned cattle are securely partitioned off in such cars or conveyance so that they will not mingle with healthy cattle or hogs.

3. The licensee shall undertake all responsibility in making shipments from loading point to destination; shall furnish bedding for cars, and provide proper disinfection of the cars when unloaded; shall obtain a Federal permit for all interstate shipments, and shall comply with all other rules and regulations of the Bureau of Animal Industry of the United States Department of Agriculture which may now be in force or may be hereafter promulgated relating to the interstate shipment of cattle which react to the tuberculin test, and shall pay all freight and switching charges, including stopping to load in transit charges, war taxes, charges connected with unloading for resting and feeding and any other charges which may be assessed against the shipment of such condemned animals.

4. The licensee shall consign shipments of such condemned cattle only to slaughter houses which are licensed in accordance with the terms of Sec. 506 of the General Laws of the State of Vermont, as amended by Sec. 1, No. 20 of the Acts of 1921, and shall be held responsible for the delivery of such condemned cattle to such slaughter houses and for the furnishing of such evidence of delivery and slaughter as the commissioner may require.

5. The licensee shall be entitled to collect from the licensed slaughter house to which such condemned cattle are consigned out of

proceeds of such condemned cattle a sum for each animal handled not to exceed the following:—

Lots taking freight rate evidenced by freight bill per cwt.	Deduction for dealer's charge per animal in the lot.
5c, 6c, 7c.....	\$2.40
8c, 9c, 10c.....	2.70
11, 12, 13	3.00
14, 15, 16	3.30
17, 18, 19	3.60
20, 21, 22	3.90
23, 24, 25	4.20
26, 27, 28	4.50
29, 30, 31	4.80
32, 33, 34	5.10
35, 36, 37	5.40
38, 39, 40	5.70
41, 42, 43	6.00
44, 45, 46	6.30
47, 48, 49	6.60
50, 51, 52	6.90
53, 54, 55	7.20
56, 57, 58	7.50
59, 60, 61	7.80
62, 63, 64	8.10
65, 66, 67	8.40
68, 69, 70	8.70
71, 72, 73	9.00

In cases where the proceeds of a lot of condemned cattle are not sufficient to pay the licensee the commission to which he is entitled under the above schedule, the licensee shall be entitled to collect the difference between the proceeds and such commission, provided the licensee has entered into a contract with the owner to that effect, but the commissioner assumes no responsibility for the collection of such sums.

6. The licensee shall not be entitled to collect from any person or corporation any sums in excess of those above enumerated, but the licensee may make arrangements with the owner of condemned cattle to handle such cattle for such sums less than those enumerated as they may mutually agree upon.

7. The licensee shall make reports in such detail and at such times as the commissioner of agriculture shall require.

8. This license will be immediately suspended for any violation of the above regulations or of the provisions of the Act by virtue of which they were promulgated, by a licensee or the agent of a licensee and such license will be revoked for cause upon hearing. A licensee may surrender his license by giving the commissioner ten days' written notice and returning his license to the commissioner.

9. The commissioner of agriculture reserves the right to change the regulations pertaining to this license upon ten days' written notice to the licensee, in which case this license shall be returned by the licensee to the commissioner, and a new license substituted therefor.

.....
Commissioner of Agriculture.

The following is a copy of the license issued to slaughter houses:

SLAUGHTER HOUSE LICENSE.

By virtue of the provisions of Sec. 506 of the General Laws of the State of Vermont, as amended by Sec. 1, No. 20 of the Acts of 1921, of hereinafter referred to as the licensee, is hereby given a license to slaughter and dispose of animals condemned as tuberculous in accordance with the terms of said act and the following regulations, which have been duly approved by the Governor of Vermont as in said Act provided:

1. The licensee shall enter into an agreement in writing with the commissioner of agriculture, State of Vermont, which shall be hereinafter referred to as "the agreement," in accordance with the terms of which animals slaughtered, or parts thereof, will be paid for and certain deductions will be made for slaughter, handling charges, et cetera. The terms of this agreement will be printed by the commissioner and made known to owners of condemned cattle and such terms shall not be changed by either the licensee or the commissioner without ten days' written notice being given to the other.
2. The licensee shall receive such cattle condemned as tuberculous according to the laws of Vermont as owners of such cattle, or dealers licensed to handle such cattle, may from time to time deliver or consign to the plant operated by the licensee.
3. The licensee shall slaughter such condemned cattle under the supervision of a regularly authorized veterinary inspector of the Bureau of Animal Industry, United States Department of Agriculture, as promptly as possible after arrival at the slaughter house, and, pending slaughter, shall hold such cattle under humane conditions, giving feed and water at least twice daily.
4. The licensee shall dispose of slaughtered animals as follows:
 - (a) Hides shall be weighed promptly and the owner credited with the number of pounds at the highest market price for the grade of hide which obtains on day of slaughter.
 - (b) All parts of animals slaughtered and condemned as unfit for food by the veterinary inspector of the U. S. Bureau of Animal Industry shall be disposed of in accordance with the rules and regulations of that bureau. The licensee shall credit the owner with the value of the animal for tannage, et cetera, in accordance with "the agreement."
 - (c) Meat, tallow and other marketable portions of animals which are passed as fit for food by the veterinary inspector of the U. S. Bureau of Animal Industry shall be sold by the licensee at the highest possible price in the best available market and the owner credited with the gross proceeds of such sales. If the licensee shall retain in his own plant any meat, tallow, or other marketable portions for manufacturing or other purposes he shall credit the owner with the sums which these articles would have brought if sold at the highest possible price in the best available market.
- If the license shall stipulate in "the agreement" that certain portions of the animal will be accepted in lieu of slaughter charges, then the owner shall not be credited with the proceeds of the sales of such portions.
5. The licensee shall be allowed for services in slaughtering such condemned animals, the sale of meat and other products and any other

services performed in the slaughter and sale of such condemned animals, such sums as the licensee shall be entitled to under the terms of "the agreement." The licensee shall not be entitled to assess against any shipment feeding or yardage charges incurred after the delivery of the cattle to the plant of the licensee.

6. The licensee may deduct from the proceeds of a lot of condemned cattle which are consigned by a dealer licensed by the commissioner of agriculture, State of Vermont, to handle such cattle, a sum for each animal in the lot, not to exceed the following:

Lots taking freight rate evidenced by freight bill per hundredweight.	Deduction for dealer's charge per animal in the lot.
5c, 6c, 7c.....	\$2.40
8c, 9c, 10c.....	2.70
11, 12, 13.....	3.00
14, 15, 16.....	3.30
17, 18, 19.....	3.60
20, 21, 22.....	3.90
23, 24, 25.....	4.20
26, 27, 28.....	4.50
29, 30, 31.....	4.80
32, 33, 34.....	5.10
35, 36, 37.....	5.40
38, 39, 40.....	5.70
41, 42, 43.....	6.00
44, 45, 46.....	6.30
47, 48, 49.....	6.60
50, 51, 52.....	6.90
53, 54, 55.....	7.20
56, 57, 58.....	7.50
59, 60, 61.....	7.80
62, 63, 64.....	8.10
65, 66, 67.....	8.40
68, 69, 70.....	8.70
71, 72, 73.....	9.00

The licensee shall pay the licensed dealer making such shipment the sums thus deducted and shall take voucher therefor.

7. The licensee shall deduct from shipments made direct by owners of such condemned cattle actual charges, which shall include freight, bedding if furnished by the railroad, cleaning and disinfection of cars and any other charge which may be properly assessed against such shipment. If the proceeds of a lot of condemned cattle are not sufficient to cover the expenses herein enumerated, the licensee may collect from the owner a sum large enough to make good the deficit.

8. The licensee, after deducting from the gross receipts of a lot of condemned animals the sums above enumerated shall return to the owner of such cattle at the time they were condemned the balance of the proceeds from such condemned cattle, together with a statement of account on a form to be furnished by the commissioner of agriculture, and two copies of such statement of account shall forthwith be mailed to the commissioner of agriculture, Montpelier, Vermont.

9. The licensee shall furnish reports in such detail and at such times as the commissioner may require.

10. This license will be immediately suspended for any violation of the above regulations or of the provisions of the Act by virtue of

which they were promulgated, by a licensee or the agent of a licensee and such license will be revoked for cause upon hearing. A licensee may surrender his license by giving the commissioner ten days' written notice and returning his license to the commissioner.

11. The commissioner of agriculture reserves the right to change the regulations pertaining to this license upon ten days' written notice to the licensee, in which case this license shall be returned by the licensee to the commissioner, and a new license substituted therefor.

.....
Commissioner of Agriculture.

RECOMMENDATIONS.

REGULATION OF THE USE OF TAGS.

The department has had sufficient evidence to warrant the belief that tags issued to veterinarians are misused by owners by removing from the ear of one animal and inserting in the ear of another, for purpose of fraud. I recommend that the misuse of tags inserted in the ears of animals for purposes of identification as reactors, suspicious animals or healthy animals, should be made a penal offense, punishable with fine or imprisonment or both.

OATH REQUIREMENT.

Since the payment of indemnity by the state is conditional upon the ownership of an animal for a certain stated period and upon fulfillment of other conditions, the law should be so amended that the owner of cattle should be required to take oath to statements made by him so that he may be prosecuted for perjury in case false statements are made.

VIOLATION OF AGREEMENT.

Sec. 500 of the General Laws as amended by Sec. 4 of No. 18, Acts of 1919 provides that the commissioner shall prescribe as a condition of making a tuberculin test the

the test until he has refunded to the state treasury any sums received from the state for indemnity from the time of the passage of this act. Another section of the law provides that an owner shall keep his herd free from tuberculosis at his own expense after it has once been accredited. Some owners of accredited herds have failed to have retests made at their own expense, and there is danger that some of the work done in eradicating tuberculosis will be vitiated by failure on the part of the owner to keep the agreement. I would recommend that the law be changed to provide that when an owner violates his agreement in any way the expense incurred by the state, both for making tests and for indemnity can be immediately recovered into the state treasury. The owner of a herd should enter into partnership with the state to follow the course prescribed to produce and maintain a clean herd of cattle. If the owner violates his agreement and does not fulfill his part, the sums expended by the state on such herd should be immediately returned to the state treasury.

AREA WORK.

There is considerable public sentiment in favor of the expenditure of money appropriated for the eradication of bovine tuberculosis in areas rather than having it scattered all over the state among herds whose owners voluntarily make application for a test under the accredited herd plan. Many states of the union are adopting area work on a wide scale and it should be seriously considered whether or not Vermont should adopt this policy.

A farm is a portion of the area of the state and assuming that as a result of a year's work the department is able to test under the accredited herd agreement the cattle on one thousand farms scattered throughout the state, the question is, are we making as much progress in tuberculosis eradication as would be the case if these one thousand farms were located in one county? It is my opinion that the state is just as well off in the former instance as in the latter, provided there is no serious danger of infecting the clean cattle of an accredited herd by allowing them to pasture in a field adjoining an untested herd which is affected with bovine tuberculosis. Many people feel that there is great danger of such field infection and that the state will never make progress in tuberculosis eradication until all the herds of a county are tested.

A careful search of the records of the department disclosed the fact that out of the 4,375 herds under supervision,

but eighteen seem to have tuberculosis persisting over a term of years and these herds are gradually cleaning up. But assuming that we grant pasture infection as the reason for the continued outcropping of tuberculosis in these eighteen herds, the percentage is very small,—so small in fact that it is almost negligible.

Area work involves the compulsory testing of certain herds in an area whose owners do not voluntarily make application. The freeing of a herd from bovine tuberculosis requires the helpful cooperation of the owner with the live stock department in the carrying out of a definite plan of procedure. It is manifest that the live stock department cannot police every herd and know what is going on daily in its handling and care. An owner who was forced to make a tuberculin test and who wished to thwart the efforts of the department could easily reinfect his herd by failure to carry out the terms of his agreement. It is my opinion that compulsory testing of cattle in regions where there is much tuberculosis and where a considerable percentage of public sentiment is unfavorable is not the best policy. The reaction against it has in many places been a detriment to the cause of tuberculosis eradication.

In some sections of the state, the cattle in entire communities have been tested and a form of area work really carried out. These sections are rapidly approaching the time when a definite area can be enrolled and cattle freed from this disease. In other sections opposition against the tuberculin test is still violent, and I think it would be a distinct mistake to attempt to compel owners to adopt the test. Those sections which have adopted the tuberculin test on a large scale and now have as a result a large number of accredited herds are attracting buyers from other states in great numbers and the price of cattle is very much higher than in those sections where tuberculin testing is not carried on. This provides an economic compulsion which will ultimately lead to the voluntary acceptance of the tuberculin test throughout the state. The live stock department for the past two years has never had on its waiting list less than one thousand applications for tuberculin tests. This shows that the farmers of the state want the work done faster than present appropriations will permit. As long as this condition continues I believe that it is better policy for the state to continue its present plan than to adopt area testing on a large scale. It is my opinion that the danger of infecting clean herds from a neighbor's pasture will be much overbalanced by the evils which will follow compulsory testing. I would recommend, however, that the legislature pass an

enabling act permitting area work to be carried on in townships when a certain percentage of the citizens so vote and when a large percentage of the cattle owners of the town sign applications for the tuberculin test.

APPROPRIATION.

There has been considerable feeling that the appropriation for the live stock department of \$200,000 per annum was too large. This appropriation has been matched, insofar as tuberculosis eradication work is concerned, by the U. S. bureau of animal industry and has not enabled the department to meet the demands of the farmers upon it for this type of work. The laws enacted by the legislature of 1919 and 1921 committed the state of Vermont to a program of tuberculosis eradication under the accredited herd plan, and 16% of our cattle have been tested under this plan and when the appropriation for the next fiscal year is expended it is my opinion that 20% of the cattle will have been tested under this plan. A wide acceptance of the accredited herd plan or the area plan in other states seems to point to a continuance of federal aid on its present scale or perhaps upon a greater scale. I would therefore recommend that an appropriation of \$200,000 per annum for the next two fiscal years be made by the next legislature as the sum needed by the live stock department to reasonably meet the demands made upon it by the farmers of the state, and as the sum which we may reasonably expect will be duplicated by the federal government in this work.

4. INDEMNITY FOR BEEF.

Under Section 507 as amended by Sec. 2 of No. 17, Acts of 1919, indemnity is paid by the state for animals which are slaughtered for human consumption and after inspection declared to be tuberculous.

The following table shows the expenditures for these beef claims by counties during the past two fiscal years:—

EXPENDITURES FOR BEEF CLAIMS—BY COUNTIES

	1921		1922		Total		Per Cent (%)
	Head	Amount	Head	Amount	Head	Amount	
Addison	7	\$ 230.63	9	\$ 254.96	16	\$ 485.59	2.5%
Bennington	...	...	...	...	...	...	...
Caledonia	10	250.18	16	361.97	26	612.15	3.1%
Chittenden	185	6,345.67	232	7,320.86	417	13,666.53	69.3%
Essex	3	112.53	4	126.65	7	239.18	1.2%
Franklin	26	731.65	31	839.19	57	1,570.84	8.0%
Grand Isle	...	...	1	30.00	1	30.00	0.1%
Lamoille	12	235.84	5	119.29	17	355.13	1.8%
Orange	4	109.96	3	76.60	7	186.56	0.9%
Orleans	18	520.02	27	585.23	45	1,105.25	5.8%
Rutland	2	70.84	...	...	2	70.84	0.4%
Washington	16	578.26	2	64.27	18	642.53	3.3%
Windham	1	47.25	5	219.68	6	266.93	1.4%
Windsor	8	290.04	7	189.21	15	479.25	2.4%
Totals	292	9,522.87	342	10,187.91	634	19,710.78	100.0%

The money expended for condemned beef does not contribute to the eradication of bovine tuberculosis in any way, but insures breeders of tuberculous animals against losses and protects the public from the sale of badly diseased meat.

It is my opinion that the legislature should carefully weigh the advantages and disadvantages to the state of this policy and determine whether the money so expended would not be of greater benefit if devoted to the eradication of tuberculosis rather than to providing a market for tuberculous beef.

The following table shows in detail the expenditures of the live stock department for the two fiscal years beginning July 1, 1920 and ending June 30, 1922:

LIVE STOCK DEPARTMENT

Financial Statement July 1, 1920 to June 30, 1922

DISBURSEMENTS	1921	1922
Claims paid for:		
Cattle condemned and destroyed:		
Cooperative tests—state proportion 1921, 2,299 head, 1922, 3,469 head.	\$ 108,097.95	\$ 85,567.74
Private tests, entire indemnity paid by state 1921, 480 head 1922, 578 head.	37,651.14	40,002.29
Total Claims paid by state for cattle tested and killed.	145,749.09	125,570.03
Animals slaughtered for human consumption and found tuberculous:		
1921		
275 cattle, 112,788 lbs; 17 hogs, 3,519 lbs.	9,522.87	
1922		
328 cattle, 133,448 lbs; 14 hogs, 2,768 lbs.		10,187.91
Horses condemned and destroyed:		
1921		
4		
1922		
None	326.25	
Salvage received and paid owners for reactors at private tests, 1921 and 1922.	600.86	367.25
Salvage received and paid owners on suspects killed and found not diseased.	16.76	3.13
Total Claims paid.....	\$ 156,215.83	\$ 136,128.32
State Veterinarians:		
1921		
Salaries	\$11,279.64	\$11,999.52
Expenses	3,230.36	4,120.00
	\$ 14,510.00	\$ 16,119.52

		1921	1922
Miscellaneous Veterinary Services:			
Examination of animals killed for human consumption and found tuberculous.		1,114.44	645.16
Inspector enforcing live stock laws, Salary and expenses.		507.27	1,271.56
Inspector at Burlington Rendering Plant.		635.93	
Inspectors of Disinfection, Salaries and Expenses.			2,259.69
Department Expenses:	1921 1922		
Deputy Live Stock Commissioner, Salary and Expenses,		1,611.12	2,312.79
Clerical		1,801.50	2,100.00
Postage, Telephone, Telegraph		490.01	233.99
Freight, Express, cartage, Tuberculin, Vaccine, et cetera		5.02	15.76
Printing, Stationery		560.95	
Thermometers, tags, et cetera		356.45	121.45
Office supplies and equipment		773.33	1,367.47
Driving cattle		747.72	493.21
Miscellaneous		181.63	
		41.94	34.00
		6,569.67	6,678.67
Gross Expense		179,553.14	163,102.92
Less current accounts not paid until after July 1.		1,499.39	12,227.04
		\$ 178,053.75	150,875.88
Plus previous year's accounts paid after July 1.			1,499.39
Total disbursements,			\$ 152,375.27
Receipts			
Sale of Hides and carcasses		\$ 26,604.35	
Sale of ear tags, serum, et cetera		96.48	15.11
Refunds on freight, telegrams, etc.		1.15	99.79
For retesting accredited herds			44.64
Total Receipts		\$ 26,701.98	\$ 159.54
Summary			
Gross expense, as above		\$ 179,553.14	\$ 163,102.92
Total receipts		26,701.98	159.54
Net Cost		\$ 152,851.16	\$ 162,943.38
Appropriations			
Appropriation.....		\$ 100,000.00	\$ 150,000.00
Appropriation, No. 21, Acts of 1921.....		50,000.00	
Balance of receipts available July 1.....		3,576.50	2,215.73
		153,567.50	152,215.73
Less Net Disbursements.....		151,351.77	152,215.73
Balance of Receipts available July 1.....		2,215.73	

Year Ending June 30, 1922.

PERCENTAGE OF TOTAL DISBURSEMENTS USED FOR:

Claims for Cattle Killed

Cooperative Tests	52.4%
Private Tests	24.5%

All tests.....76.9%

Beef Claims.....6.2%

Salvage Paid.....2%

Percentage for all claims.....83.5%

Overhead Expense

State veterinarians	59.7%
Miscellaneous veterinary service	2.3
Inspector live stock laws	4.7
Inspectors of disinfection	8.3
Deputy Live Stock Commissioner	8.5
Clerical	7.7
Postage, telephone, telegraph	0.8
Printing, stationery	0.4
Office supplies, equipment	1.8
Thermometers, tags, et cetera	5.0
Miscellaneous	0.8

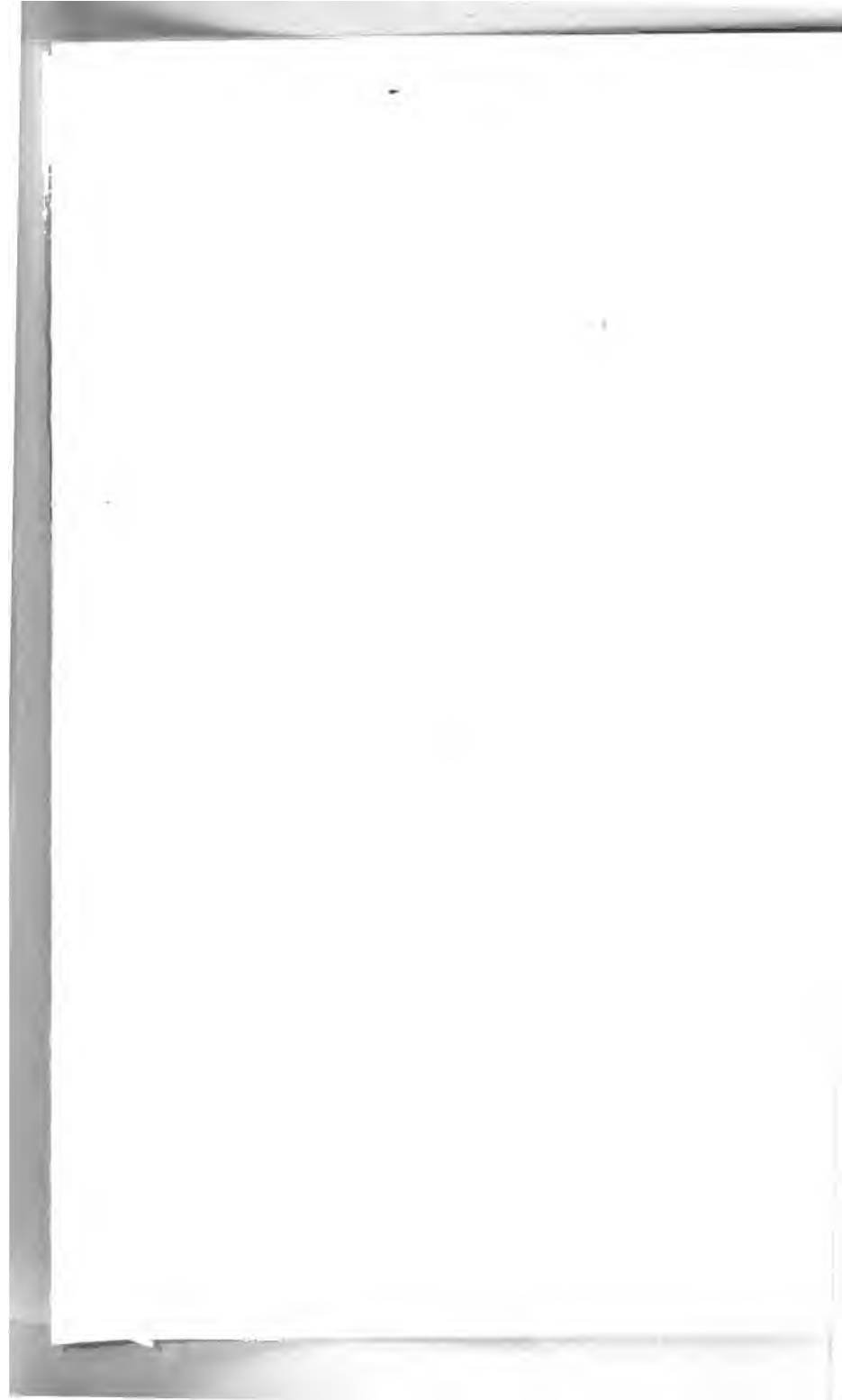
Percentage Overhead

16.5

100.0%

SUMMARY OF EXPENDITURES.

	1921	1922
Average indemnity paid—Cooperative Tests		
State.....	\$ 47.01	\$ 24.66
Bureau.....	26.48	21.67
Average indemnity per animal.....	73.49	46.33
(State) Average indemnity, Private Tests	78.44	69.20
Cost of Testing:		
Bureau.....	17,774.26	21,663.38
State.....	13,182.98	16,119.52
Total cost of testing.....	30,957.24	37,782.90
Average cost of testing per herd		
Bureau.....	6.27	5.68
State.....	4.65	4.22
Total average cost per herd.....	10.92	9.90
Average cost of testing per animal		
Bureau.....	.33	.33
State.....	.25	.25
Total average cost per head.....	.58	.58
Cost of Disinfection:		
Number of places disinfected	680	972
Total cost, Bureau.....	4,362.80	4,368.29
Total cost, State.....		2,259.69
Total cost of disinfection.....	4,362.80	6,627.98
Average cost of disinfecting each place	6.41	6.81
Appraisals:		
Total appraisal on 2,246 grades		144,700.00
Total appraisal on 402 purebreds		52,702.00
Average appraisal, grade cattle		64.42
Average appraisal, purebred cattle		131.09
Average appraisal per head		74.54
Salvage: Average net received by owners		10.66
Beef Cattle:		
Average price paid per pound.....	\$.081	\$.074
Average price paid per animal.....	32.61	29.78
Average cost veterinary examination, per head.....	3.81	3.52
Total U. S. B. A. I. Expenditures	99,644.20	143,721.77
Total State Expenditures	179,553.15	163,102.92





	1921	1922
Grand Total Expended for Tuberculosis Work in Vermont, including private tests and beef claims	279,197 .35	306,824 .69
Total Cost of Cooperative Testing: (Sec. 500 as amended by Sec. 4, No. 18, Acts of 1919 and Sec. 1, No. 18, Acts of 1921).....	107,434 .16	109,222 .57
Average received by owners:		
Average total indemnity.....	73 .49	46 .33
Average net salvage.....		10 .66
Total.....	73 .49	56 .99

REPORT OF STATE FORESTER

E. S. BRIGHAM.

A detailed statement of the work done by the forestry department is contained in the report of Chief Forester W. G. Hastings, which follows. I will, however, give a brief summary of some of the more important phases of the work, with a view to making certain recommendations.

STATE FORESTS.

The state has acquired by gift or by purchase a considerable acreage of forest lands since the forestry department was organized. The following table shows the location and size of these forests:

Name of Forest	Location	Area in Acres
George Aitken	Mendon	800
Arlington	Arlington	225
Battell	Camel's Hump	4,500
Downer	Sharon	800
Groton	Groton, etc.	15,000
M. J. Hapgood	Peru	100
L. R. Jones	Plainfield	600
Lyndon	Lyndon	75
Mansfield	Mt. Mansfield	5,000
Proctor-Piper	Cavendish	400
Putnam	Worcester	1,400
Townshend	Townshend	700
West Rutland	West Rutland	350
Total		29,950

All boundaries of these forests have been surveyed and marked, maps have been completed of about 16,000 acres, showing boundaries, contours, timber types and soil types. The mapping will be carried on and completed as rapidly as the resources of the department will permit.

Our state forests are valuable as a means of giving demonstrations to the people of the state in good forest management and they may also be looked upon as an investment which will in future years make a good return on the

money expended. I recommend that the appropriation of \$7,500. per annum for the purchase of forest lands and their development be continued during the next biennium and expended largely upon the forests which the state now owns in outplantings, thinnings and such other improvements as good forestry principles may suggest.

STATE FOREST NURSERIES.

Since the farm woodlot plays such an important part in the forestry development of Vermont, it is essential that state nurseries for supplying forest seedlings be developed to supply the demand for trees for outplanting.

The state, under the terms of the deed of gift conveying the property, is bound to maintain the nursery at Sharon. The location of this nursery is such that it is difficult to procure labor and the hauling distance to the railroad is a great handicap. The soil, furthermore, is not of the best for nursery purposes. This nursery should not be greatly expanded.

The site formerly provided by the University of Vermont near its athletic field had to be vacated as far as possible in the spring of 1922. The remaining trees, which could not then be moved, will be transferred next spring to the new site provided by the University near Essex Junction.

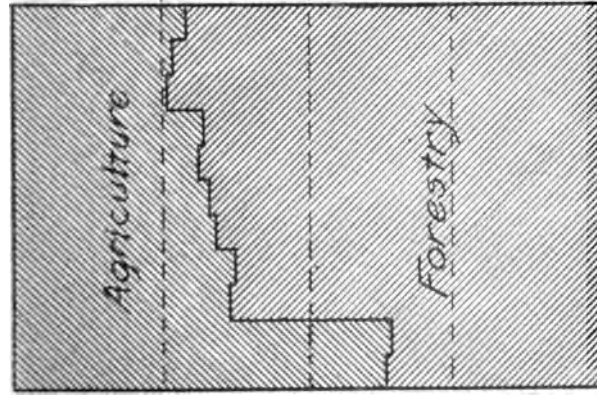
The land in the new site has been rented by the University and turned over to the forestry department for nursery purposes for a period of ten years. It is very expensive to prepare land for nursery purposes and to put it in a condition of fertility and tilth which will enable successful tree growing to be carried on. I recommend that an appropriation be made for the purchase of the nursery site at Essex Junction, so that it will be the property of the state. This will enable the department to develop a large nursery without facing the possibility of moving again in ten years.

TAXATION OF FOREST LANDS.

It seems to be the general opinion of owners of forest lands that our taxation laws and our method of administering such laws are deterrents to the handling of our timber lands in accordance with good forestry principles. I would recommend that a thorough study of this problem be made by the legislature with a view to the enactment of a more equitable and workable law.

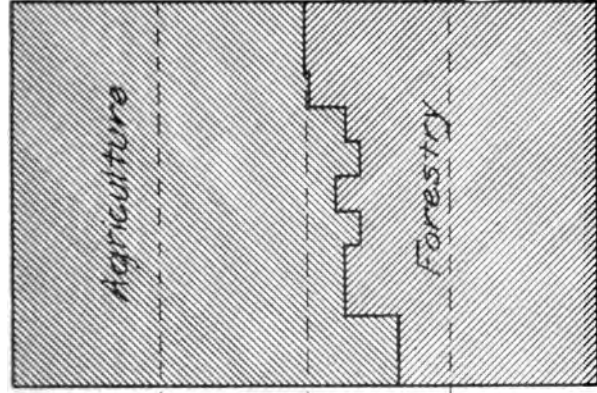
EXTENSION OF FORESTRY WORK.

Certain recommendations have been made by Chief Forester Hastings for the extension of the work of the department. I would call particular attention to his recommendation in regard to providing facilities for the department to do more work along the line of the utilization of forest products. It would mean much to the state to have its timber owners get as much as possible from timber, and the encouragement of wood working industries within the state would be of great value from the standpoint of industrial development.

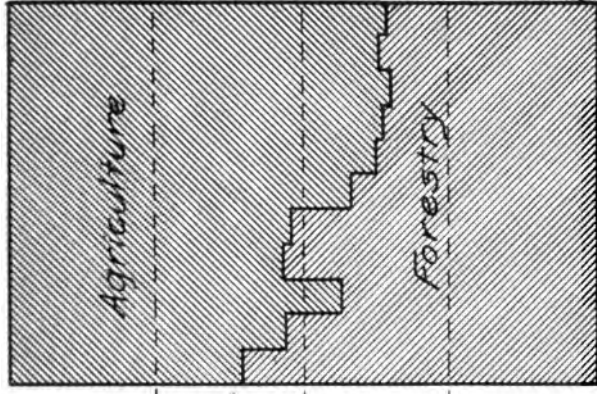


New Hampshire

Agricultural Fund
includes Board of Agriculture
money only; it includes bovine
tuberculosis funds and also many
other special appropriations.



Ave. of N.Y., Mass. and N.H.



Vermont

Forestry Fund
includes State approp-
riation money only; it excludes
land purchase funds and also
special appropriations, if any.

RELATION OF EXPENDITURES

Agriculture and Forestry

1912 to 1922 inclusive

REPORT OF CHIEF FORESTER.

W. G. HASTINGS.

FORESTRY DEFINED.—"Forests are more than trees. They are rather land areas on which are associated various forms of plant and animal life. The forester must deal with all. Wild life is as essentially and legitimately an object of his care as are water, wood and forage. Forest administration should be planned with a view to realizing all possible benefits from land areas handled. It should take account of their indirect value for recreation and health as well as their value for the production of*****wood and the protection of water supplies."—Col. Henry S. Graves, Chief Forester, U. S. Forest Service, 1910 to 1920.

"Forestry does not end when the timber crop is mature any more than does agriculture end when the farm crop is ripe. In agriculture the grain must be gathered, threshed and sold on the market. And so it is with Forestry. The products of the forest—wood, water, forage, game, fish, recreational advantages—must be manufactured into an article of trade or harnessed to a water-wheel, protected against irrational use, advertised, or in some other suitable manner prepared for sale."—Dr. Hugh P. Baker, Dean New York College of Forestry.

These are not fictitious definitions of forests and forestry. They are concise statements of what is meant by the word forest and of the activities which the word forestry implies. Forestry, then, deals not only with timber production (which is merely silviculture) but also with forest protection, forest recreation and the complete utilization of the major and minor products of the forest.

Within the word "silviculture" is embodied the thought of regrowth, of seed time and harvest, of continuous supplies, of land usage, of husbandry. "When the mines are emptied and the quarries exhausted the forest will still be growing." The whole work of silviculture is a gift of the present to the future, or rather the payment of a debt which the present generation owes to an age that is past. In still other words silviculture is one of the avenues of activity through which man may obey the edict imposed by land tenure, to be a good steward. Within the word "protection" on the other hand is embodied the thought of perpetuation, of conservation—the eternal war which is waged against the forces of destruction. These two phases of forestry, denoting increase and preservation, have two companion phases, denoting revenue—utilization and recrea-

tion—in which this generation finds its reward. However, unlike silviculture and protection, the real force of the word “utilization” is not found on the surface. The meaning is more obscure. Utilization aims to secure complete manufacture at home, stable industries, permanent local employment, recolonization around a small industrial centre as a unit. It also aims to increase revenues to farmers who have stumpage for sale, timberland owners and manufacturers using wood as a raw product, as well as does the complete development of our scenic advantages under the heading “recreation” aim at greater revenues, because forest recreation properly employed means a tourist trade of millions of dollars annually. However, recreational forestry means more than a tourist trade. It means roadside beautification, the development of highways for pedestrians in the mountains, the establishment of tourists’ camp sites along road sides through the purchase, development and maintenance of suitable camping places. It includes the landscaping of village parks and farmsteads. It also includes the work now done for sportsmen in the propagation of fish and game and the regulation of the catch and kill.

Forestry, then, includes within itself four major divisions of the subject—silviculture, protection, recreation and utilization—each of which is worthy of careful fostering, and is being so fostered, by the several states and by the nation. It is impossible to say, taking the nation as a whole, which division should receive the most public attention and which the least, but it is certain that the waning supplies of timber have played a major role in awakening the public to the realization that silviculture must be practised and it is therefore natural that interest in timber production and forest protection should dominate all other phases of forestry during the development of the art of forestry on this continent.

PUBLIC INTEREST.—The timber shortage problem caused by nation wide over cutting of forest lands has been actively before the American people since 1878. In the attempted solution of it the impression has been created in the popular mind that much more is being done to arrest forest depletion than is actually the case, resulting in unwarranted indifference. In a limited sense people have a right to feel that great strides have been taken in forestry since 1878. More exactly, however, very little has been done in keeping with the magnitude of the problem to warrant a feeling of satisfaction. Congressmen have talked about it, conducted investigations, asked for reports and have in a small way responded to the appeal of a few men whose singleness of

purpose and vision and wisdom brought to the minds of some congressmen the true situation. For example, national forests and a government forest service have been established and everybody having knowledge of it points with pride to the acreage of national forest lands under administration. But the problem of timber depletion still remains unsolved. Congress has failed to move forward, after making a creditable beginning, very largely because the public being uninformed, has not demanded it.

In view of our past experiences this attitude or lack of interest is not altogether surprising. For two hundred years in the development of this country the forest was considered a hindrance and we as a people, to our own great detriment, got out of the excellent habit, innate among Europeans, of looking upon the forest as an object of care, and comparatively few people realize that the time has come when the best forestry practice possible throughout the nation by all public agencies cannot prevent the evils of a timber shortage which is now upon us, and, from the most sanguine outlook, must remain a retarding influence in our national development for nearly if not quite a hundred years to come. Congress has started the good work but is making progress all too slowly.

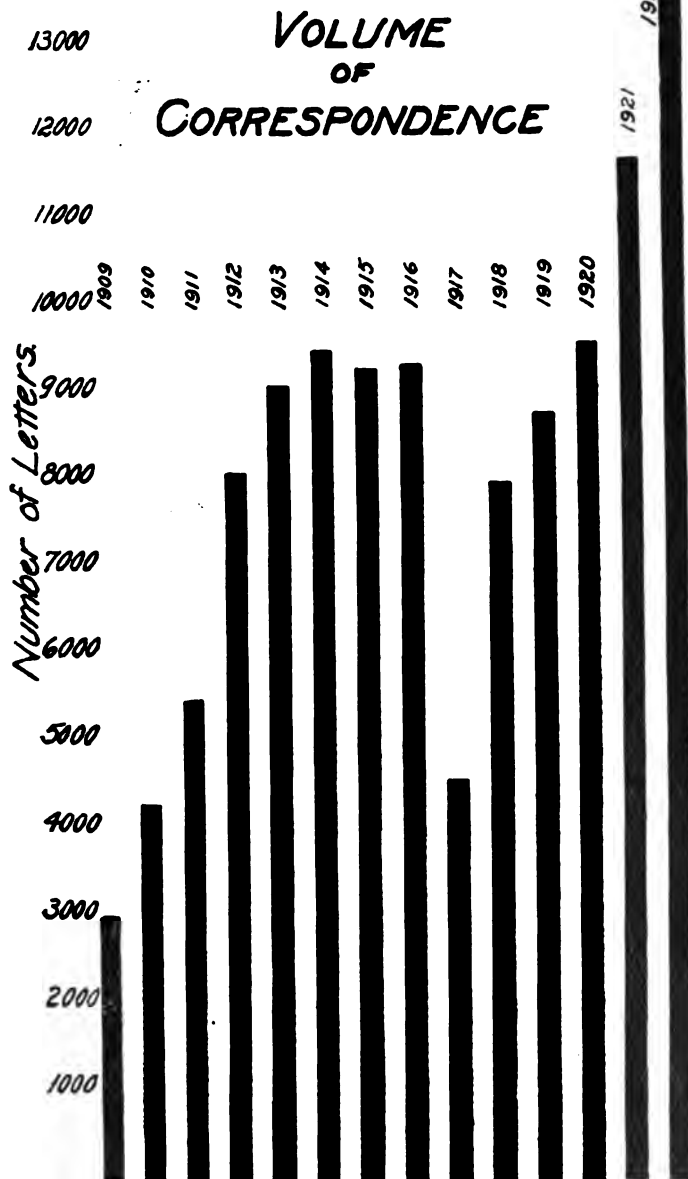
However, upon the several State Governments as well as upon the Federal Government does the solution of our timber shortage lie, and the state legislatures, except those of Pennsylvania and Massachusetts are as backward in their work as is congress. Vermont has not yet put forth one-quarter the effort she ultimately will in this new field of governmental activity, but it is encouraging to note that at each session of the legislature some additional progress is made which, if continued and added to by succeeding legislatures, will lead to success. This slow but rather certain progress denotes a gradual awakening to the fact that forestry, in its largest sense, is a function of government and this realization is finding expression in legislative enactments providing, in several different departments of the State Government, for the protection of our forests and streams and wild life.

As a further analysis of the public interest in forestry, and to more clearly understand the trend of forestry in Vermont a graphic statement of the amount of money available for forestry purposes has been prepared. From the graph it may be seen, if increases in annual appropriations made by the several state legislatures to their respective forestry departments constitutes a just criterion, that forestry in Vermont is not keeping pace with the normal development

of forestry in other states or with the normal development of the other state activities in Vermont. (See frontis piece).

PERSONNEL ACTIVITIES.—The work of the forestry department through law enforcement, through educational propaganda, demonstration and personal contact is carried on along four distinct lines, namely—silviculture, protection, recreation and utilization. The chief forester, through constant inspection, is at all times in touch with the details of all work; the most technical phases of silviculture or of insect and disease control are discussed with him and the underlying principles of every detail of work of any kind—telephone construction, lookout tower equipment, nursery practice—receives his sanction before state or federal money is expended in a particular manner or for a particular purpose. He personally visits lookout towers, patrolmen on their trails, the state nurseries, the state forests, and reviews all correspondence that comes into and leaves the office. He personally attends to most of the correspondence of the office, which amounts to nearly fifteen thousand letters a year. He, himself, attends to such departmental matters as lands, waters, recreation, utilization, as well as his administrative and inspection work. The chief forester is engaged much of the time in speaking and devotes some of his time to interviews with private timberland owners. He also teaches forestry subjects to the agricultural students at the University of Vermont, devoting three days a week to this class of work from February to June, inclusive.

In addition to the chief forester there are two assistant foresters working full time, one assistant forester working part time, and one full time federal blister rust agent, all working out of the Montpelier office. These men are conducting the work of silviculture, fire protection, miscellaneous odd jobs in utilization, and white pine blister rust control respectively. There is no overlapping of their fields of work, or duplication of travel or other expense. Also, in addition to these assistant foresters there are two district foresters engaged in forest fire protection; three federal field agents engaged in blister rust control; one district forester engaged in miscellaneous work largely of a silvicultural nature; one office clerk; one nursery superintendent and one farm superintendent. Two additional assistant foresters are needed to take up the work of recreation and utilization respectively, and thus leave the chief forester time to devote to writing, speaking and closer administration of the forestry department including field inspection.



FINANCIAL STATEMENT

SOURCE OF FUNDS.—In reviewing the following table the fact should be kept in mind that a large part (over 25%) of the total funds expended comes from sources other than state appropriations. Over \$17,000 was allotted by the Federal Government and nearly \$7,500 came to the department as earnings.

Fiscal Year.	1921	1922
Appropriations	\$20,680.00	\$29,645.00 (1)
Expenditures	32,586.02	45,294.34
Detail of Expenditures:		
Administration	\$ 4,620.38	\$ 5,500.98
Headquarters		15.85
Job to job travel.....	211.99	
Sundays, leave and holidays.....	20.00	
Conferences (general)	8.00	
Silvics: studies and reviews.....	1,365.03	6.00
Lectures and exhibits.....	259.60	335.37
Advice in forest management.....	309.24	784.75
Markets and lumber statistics.....		4.00
Nurseries: operation of.....	4,662.26	7,207.62
Inspection, taxes and insurance.....	2,368.82	2,398.35
Timber sales and imp. cuttings.....	33.50	316.13
Soil, cover and boundary survey.....	693.81	3,277.79
Outplanting	1,683.44	1.85
Special uses		107.00
Buildings: maintenance of.....	36.82	
Purchase of land.....		400.00
Fire prev'n, det'n and extinction....	4,654.60 (2)	12,480.09 (3)
Fire improv'm'ts, con. and maint'ance.	739.49	2,151.75
Disease and insect control (general).	1,208.71	8,306.83
Additional federal money expended..	9,710.33 (4)	2,000.00 (5)
Totals	\$32,586.02	\$45,294.34
Recapitulation of Detail:		
Salaries	\$ 8,174.29	\$11,349.75
Travel	2,944.60	6,642.47
Labor	17,117.92 (4)	20,078.43 (5)
Tools, supplies, materials, etc.....	1,054.15	3,572.90
Freight and express.....	135.81	514.19
Postage, telephone and telegraph....	353.74	538.49
Printing	223.97	257.61
Land purchases		400.00
Insurance, taxes, miscellaneous.....	2,581.54	1,940.50
Totals	\$32,586.02	\$45,294.34

(1) \$4,900.00 from the contingent fund.

(2) \$1,300.00 of this sum is federal money paid into the state treasury.

(3) \$4,150.00 of this sum is federal money paid into the state treasury.

(4) \$8,285.00 of this is U. S. Bureau of Plant Industry money expended in blister rust control, and \$1,425.33 is U. S. Forest Service money expended in fire control.

(5) \$2,000.00 federal money expended by U. S. Bureau of Plant Industry in blister rust control and here reported.

MANAGEMENT OF STATE FORESTS

PURCHASE. Since the last report the Groton State forest has been enlarged by one hundred sixty acres purchased of John Foss of Plainfield, Vt., at \$400.00, and by the purchase of approximately nine thousand acres from Robert J. Miller and Marion L. Miller, of Groton, Vt., at a cost of \$15,000.00. Part payment was made in March, 1922, and the deed placed in escrow and the balance paid July 1, 1922. The tract adjoins the Goslant purchase described in the 1919-1920 report. These three purchases (Miller, Goslant and Foss) give the department a forest unit of about fifteen thousand acres—the largest single unit of forest land owned by the State. The forest lies in the town of Marshfield, Washington County, and the towns of Peacham and Groton, Caledonia County, on both sides of the Montpelier and Wells River Railroad, and includes the stations of Edgewater, Lanesboro, Rocky Point and Lakeside. Groton, Rickers, Kettle, Osmore, Niggerhead and Peacham Ponds are partially or entirely within the forest. The whole area has been heavily logged at one time or another, especially for spruce and fir, taking the best of the hard woods, also. Fire has not been kept out. As a result the forest, nine-tenths of it at least, is coming back largely to hard wood species, giving rise to a hard wood cover in which spruce occurs as isolated specimens. The remaining tenth supports coniferous reproduction in which spruce and balsam vie with each other for supremacy.

Since this forest has been called upon repeatedly in the past to give up its mature timber, many years must pass before it can again yield material of value in large quantities, but under careful management it will produce timber of higher grade, of greater volume per acre, of more desirable species and in a shorter period of time than it would were it to remain in its present wild state. The Groton, Mansfield and Battell forests are being managed for water conservation and timber production, while the other forests are managed as demonstrations of good silviculture. Many Vermonters each year plant forest tree seedlings from our State nurseries because they have seen how well the forest plantations on the State lands are growing. Others have improved their wood lots after seeing improved hard wood areas on State forests.

SALES. As yet timber sale work has not been developed to a very large extent, because of lack of funds to properly attend to the details of timber sale work. It is impossible as well as too expensive for one man from the Montpelier office to look after numerous small sales on the several forests. District foresters are needed very badly for this work.

On the George Aitken forest, in the town of Mendon, a considerable number of small timber sales were made. During the two years 1921 and 1922, a total revenue of about \$1,200. was realized from sale of wood and the forest was left in an improved condition. About sixty different persons cut wood from this forest and thus found employment for themselves and fuel for their families. A double purpose is being served here. The forest is being improved while work is furnished to men when they could find no other source of income. In such a way more of the State forests might serve the people of Vermont if there were field men to supervise the sales.

USES. The Groton State forest has shore lines on Kettle, Niggerhead, Osmore, Groton, Rickers and Peacham Ponds, all of which are suitable for summer cottages. Already there are several cottages on Niggerhead and Groton and a few on the other ponds. Rental of these cottage sites net the Department a hundred dollars or so annual revenue. There is an opportunity, however, for much greater development along these lines with an income to the State from this forest of a thousand dollars or more per year. During the years 1921-1922 the total income was \$180.00 in addition to certain rents which are paid periodically instead of annually.

During the summer 1921, nine lots on Niggerhead Pond and eighty-seven lots on Osmore Pond were surveyed, staked on the ground, plotted and appraised for rental purposes, but this is only a small beginning compared to the complete task of developing the full recreational advantages of these ponds. With a specialist in charge of this work there is an opportunity to make not only this forest but other forests a source of enjoyment to Vermonters and at the same time to render a substantial income to the State over and above the cost to the State of such a specialist.

WORKING PLANS. One of the prime objects in handling the State forests is to make them produce timber and pay fair dividends to the State. In order that they may pay the largest possible rental they must be stocked with the trees that will produce the most valuable timber in the

shortest possible time. The management of these forests aims to bring a part of the crop to maturity each year. This means that there must be stands of timber of different ages from reproduction to mature trees in proper amounts, so that an equal amount of mature timber may be cut each year.

This is the task confronting the forester on such a tract as the Groton forest of fifteen thousand acres, made up of many different stands of timber growing under many conditions. It is an area so large that it becomes impossible for the human mind to retain a picture of every stand, no matter how carefully it may have been examined. For this reason it becomes necessary to visit every acre at least once in ten years to take an inventory of all that grows there, to describe topographic and site conditions and then to compile and tabulate this data. From this information it is possible for a forester to decide just what should be done silviculturally with each acre or group of acres. Plans for cutting, thinnings, planting, improvements, protection, etc. can then be made and the forest brought to a condition of sustained annual yield. Such an inventory and report is called a "working plan" and bears the same relation to forest management that the architect's plans bear to the construction of a downtown sky-scraper.

Such a working plan is to be made for each of our State forests in order that these forests may be made to produce the largest quantity of the best timber in the shortest time. During the summers of 1920 and 1921, the field work was completed on the whole of the Groton forest. The working plan itself is nearly completed.

During the spring 1921, sixty thousand Norway spruce were planted on the Groton forest, thirty-two thousand European larch on the Downer forest at Sharon, and forty thousand Norway spruce on the George Aitken forest at Rutland. During 1922, no trees were planted on State lands due to lack of funds caused by the severe fire season of 1921.

CUMULATIVE COSTS.

The following is a statement of the location, acreage and cumulative costs of the several State forests:

Name of Forest	Location	Area in Acres.	1921 Costs	1922 Costs	Cumulative Costs
George Aitkin	Mendon	800	\$945.03	\$ 288.37	\$ 5,839.84
Arlington	Arlington	225	38.53	57.26	2,990.58
Battell	Camel's Hump	4,500	178.24	319.63	4,985.32
Downer	Sharon	800	323.88	564.66	25,460.98
Groton	Groton, etc.	15,000	1,689.56	19,176.95	41,012.90
M. J. Hapgood	Peru	100			6.49
L. R. Jones	Plainfield	600	93.44	90.28	801.20
Lyndon	Lyndon	75	4.00		2,526.48
Mansfield	Mt. Mansfield	5,000	466.80	488.68	16,411.99
Proctor-Piper	Cavendish	400	113.15	146.29	1,314.74
Putnam	Worcester	1,400	40.58	66.93	492.14
Townshend	Townshend	700	135.44	165.16	7,400.67
West Rutland	West Rutland	350	22.68	59.89	2,714.82

These costs represent all net charges against a forest carried forward at 4% compound interest. The net expense for a year is determined by subtracting the gross income of the forest from the gross outlay.

MANAGEMENT OF STATE NURSERIES

DESCRIPTION. The State of Vermont through its Forestry Department maintains two nurseries, one at Sharon, Vt., and one at Essex Junction, Vt.

The one at Sharon is four miles from a railroad and located in a region where labor is difficult to obtain. For this reason only fifty thousand trees are grown for sale each year. Mr. Curtis A. Preston, in charge of the Charles Downer Farm and Forest grows them under contract at about the same cost as those grown at the Essex nursery.

The Essex nursery is a new venture. It was established in the spring of 1922, and is being operated in lieu of the old State nursery at Centennial Field, Burlington, Vt.

The new site is located about three-quarters of a mile west from Essex Junction towards Fort Ethan Allen, and is just south of the Central Vermont railroad tracks on the north side of which is the electric street car line and main highway both connecting Burlington and Essex Junction. The nursery site contains about ten acres of land, is level and bordered on two sides by land of similar character, thus permitting of future development. The soil is light and easily worked. City water is available, day labor is plentiful, and the nursery is within the zone of free collection by the express company. On the whole the site is very desirable as a forest nursery.

The area has been cleared of all brush, a water system installed, the land to some extent leveled and graded, heavily manured and a crop of buck wheat was sown (later to be plowed under) on those portions of the nursery not now occupied by seedlings. In the spring of 1922, nine hundred thousand seedlings were transplanted from the Burlington nursery and enough seed sown to produce two million trees for transplanting in 1924. The nursery site is large enough to insure a yearly output of two million transplants.

COSTS. During the transplanting and seeding period of the spring of 1922 certain unit costs in the operation of the nursery were recorded. The period covered was from April 15 to June 5 of the same year and the costs, therefore, do not indicate final costs but are of value in estimating the cost of spring work. Also, these figures were recorded at the Essex nursery where a new foreman was in charge and where all laborers engaged were green at the work.

Digging and carting, 900M 2 yr. seedlings...	No record
Puddling and transplanting, 900M 2 yr. seedlings	\$.964 per M
Lumber costs for new seed frames.....	.933 per bed
Labor costs for building new seed frames..	.16 " "
Labor costs and creosote for new seed frames	.083 " "
Total cost seed bed frames (50 per year)...	1.176 " "
Cost repair work on old frames .....	.137 " "
Yearly upkeep costs based on 300 beds...	.31 " "
Labor costs to put on formaldehyde.....	.116 " "
Sowing and covering old style beds.....	.138 " "
Sowing and covering new style beds.....	.071 " "
Construction new style lath shades, each shade 2x4 feet.....	.045 per shade

The following table shows the prices charged for nursery stock in 1921 and 1922. Cheaper labor costs in 1922 explain the reduction in prices.

	1921	1922
Scotch Pine, 3 yr. transplants.....	\$8.00	\$7.00
Red Pine, 3 yr. transplants.....	9.00	None
Norway Spruce, 3 yr. transplants.....	8.50	7.00
Norway Spruce, 4 yr. transplants.....	9.00	None
European Larch, 3 yr. transplants	4.50	4.00
European Larch, 2 yr. seedlings	2.50	None
Japanese Larch, 3 yr. transplants	None	5.00
White Ash, 2 yr. seedlings	None	5.00
Basswood, 2 yr. seedlings	None	5.00

The following table shows the combined inventories of the State nurseries as of July 1, 1922:

900,000 3 yr. transplants at	\$7.00	\$6,300.00
700,000 3 yr. seedlings at	4.00	2,800.00
300,000 2 yr. seedlings at	3.00	900.00
2,000,000 1 yr. seedlings at	1.50	3,000.00
		<hr/> \$13,000.00

Since 1918 the Department has spent \$22,494.94 in operating the nurseries and has received from the sale of nursery stock \$9,451.24. There has, therefore, been expended \$13,040.70 in excess of receipts which is secured by the stock on hand in the nursery as indicated above.

NURSERY SITE EVACUATED. In 1906 a law was passed appropriating \$500.00 a year beginning in 1907 and continuing for five years for the expressed purpose of developing a nursery site in which forest tree seedlings might be

grown for sale at cost of production to land owners in Vermont. The Experiment Station elected to receive this money under the terms imposed, and development of the site was begun by the Station with no further aid from the State. In 1908, in 1910 and again in 1917, the legislature relieved the Station of some of the obligations imposed in 1906 when the above referenced appropriations were made available by the legislature and accepted by the Experiment Station. Also, in 1908, 1910 and 1917, the legislature provided for certain assistance from the State to aid the Station in a more expeditious development of the nursery site contemplated. By 1912, at the expiration of the above period of payments, a nursery site had been developed consisting of a first class water system, storage facilities, and a soil enriched by heavy applications of fertilizer and manure. Also, the soil had been in other ways prepared for nursery work through the application of chemicals to control organic life in the soil, excessive tillage to improve soil texture, etc. At this time, when the last \$500.00 payment had been made, the nursery had reached an annual outplanting capacity of over 600,000 trees and had enough seed bed space and seedlings of various species coming on so that without further development of the site this annual production had by 1916 increased to over one million trees. This nursery site development, permitting the growing and shipping of over a million trees a year was the direct result of the expenditure of the original current annual appropriation established in 1906 by the legislature and expended by the Experiment Station to the mutual advantage of the State and Station. The Station received its reward for the use of its land from the educational advantages which the nursery afforded, while the State was receiving full value for its \$2,500.00 which had been spent in developing the site.

In the spring of 1922 through a vacating request from the University of Vermont it became necessary to occupy a new nursery site, and the attorney general ruled that the Experiment Station was under no obligation in law to develop the new site. Accordingly the board of control provided \$1,000.00 for such development, the land for which was very generously leased for the use of the forestry department by the University of Vermont. In April, 1922, the first work incident to an immediate vacation of the old site and occupation of the new site was begun. The new site was raw farm land in a rather unkept, unproductive state of cultivation. The land was exceedingly foul with witch grass and weeds, and the soil is of a character which will require twice the acreage to produce a million trees for

outplanting annually than the abandoned site required. The task of occupying land befoiled as this land was without the usual interval of several years of alternating dry-fallow with soil crops has added greatly to the cost of producing nursery stock and will continue to add to these costs for two or more years to come.

In moving nursery stock and equipment from the Burlington nursery and in developing the new site the following items of expense were incurred prior to June 30, 1922, which would not have been necessary if the nursery had not been moved, and an estimate of similar costs to the end of the fiscal year 1925 also follows:

	Paid	Liabilities
1. Removal of brush and stumps.....	\$25.50	\$10.00
2. Grading	23.87	100.00
3. Digging & removing quack grass..	365.81	350.00
4. Plowing and dragging	102.50	
5. Drayage, Burlington to Essex Junction	81.00	60.00
6. Digging ditch and laying water pipe	114.25	
7. Water pipe	408.03	
8. Manure (in excess of usual amount)	47.50	250.00
9. Drawing excess manure	38.00	250.00
10. Supervision	71.00	25.00
11. Tool House		300.00
12. Fencing		300.00
13. Roadway		50.00
14. Purchase of the land		1,000.00
	\$1,277.46	\$2,695.00

REFORESTATION OF WASTE LANDS

OUTPLANTING. The laws of the State of Vermont provide that trees suitable for outplanting shall be furnished to citizens of Vermont at cost of production. This has been done since the founding of the Forestry Department, and is still being done. The aim is to plant to trees of a desirable species all lands within the State which are now idle or which may hereafter become idle.

Nearly every farm in Vermont has a few acres of land that are producing no income at all, or a very small income at best. These acres should be planted to trees of desirable

species. Every effort is being made to interest and acquaint the Vermont farmer with facts regarding forest planting as an investment. A recent publication, "Forest Planting Opportunities in Vermont" has been prepared and sent to every available address.

RESULTS HAVE BEEN ATTAINED. Practically every year every available tree has been sold, even though the nursery is being enlarged as rapidly as funds will permit. During the spring planting season of 1922, the supply was over subscribed and many orders had to be refused. The present nursery stock on hand in the State nurseries indicate that more trees will be available in the spring of 1923, 1924 or 1925 than in the previous year.

There are at least one million acres of idle land in Vermont that will grow trees more profitably than any other crop. It will take at least one thousand million trees to plant such an area. Thus far we have planted about eight million trees in Vermont, or less than 1% of the total amount we should plant to complete the whole task. In no year have we planted over one million trees, or 2 1-2% of the amount we should plant that year (forty million), to complete the task in twenty-five years.

FOREST FIRE CONTROL

CO-OPERATION. Since 1911, the United States Forest Service has co-operated with the State of Vermont in the protection of its timber lands. In the fiscal year of 1921, the State received \$4,150.00 from this source. In 1922 this amount was increased to \$4,200.00. This money is expended by the State for fire prevention and detection and has been spent almost entirely in paying for the services of lookout watchmen and patrolmen.

The State has also co-operated with the Vermont Timberland Owners' Association so that the protection forces have been placed where the greatest dangers exist and where there would be as little duplication of effort as possible. The men paid by the State from state or federal funds have been placed where they would furnish the greatest protection to the largest area of timberland without regard to ownership. The Association has, of course, concentrated its efforts more on the protection of the areas be-

longing to or adjacent to the holdings of its members. Every encouragement is being given for land owners to join the Association because better protection can be secured for less cost by associated effort than by the divergent efforts of the individual owners.

IMPROVEMENTS. In the summer of 1920 work was continued on the development of Belvidere and Spruce Mountains for fire detection purposes in the towns of Belvidere and Plainfield respectively, also a cabin and tower were built on Ascutney Mountain in the town of West Windsor. In 1921 a tower and telephone line were built on Westmore Mountain in the town of Westmore and the construction of a cabin started. A cabin was also built on Dorset Mountain in the town of Danby and the material prepared for constructing a tower. Work was also continued on the Belvidere Mountain tower and cabin. It is planned to make the towers and cabins on these lookout points plain but neat and substantial structures, which will enable the lookout watchman to live comfortably and work effectively.

FIRES AND CAUSES. Careful studies have shown that the amount of rainfall during the summer months is the most important factor influencing the severity of the fire season. Curves showing the precipitation and number of fires by months for the years 1908 to 1921 indicate that whenever the monthly precipitation is less than two inches the number of fires begins to increase rapidly. This increase is accelerated when the decreased precipitation is accompanied by low relative humidity, increased wind movement, higher temperature and a greater amount of sunshine.

Using the Burlington weather station as the control point for the State and plotting the precipitation and number of fires for the State by months it is shown that in May, 1920, the monthly precipitation fell below two inches and that the number of fires increased enormously. The total number of fires for the season was not above normal, however, and the few bad fires occurred in localities where there was a lack of rain, which accounts for the large acreage burned and the heavy damage done.

The rainfall in the summer of 1921 was very deficient. The accompanying curve showing monthly precipitation for the Burlington station indicates that the rainfall was below the average for practically the entire season. The deficit was even more pronounced at many of the other weather stations in Vermont. In May, 1921, most stations received but a small fraction of the normal rainfall. In

June the precipitation at most stations more nearly approached the normal, although the June deficit was considerable in many places. In July, August and September only one or two stations reported a normal rainfall while most of the stations reported less than an average amount. In addition to the continued drought during 1921, the temperatures were above normal, thus aiding the process of evaporation and increasing the fire hazard.

With such adverse weather conditions prevailing it is not surprising that the number of forest fires increased. That the area and damage were kept as low as they were is due largely to the efforts of fire wardens. Prompt action on the part of the warden with a force of men large enough to put the fire completely out while it is still a small fire has proved itself to be the most economical and effective way of handling the fire situation.

FIRES CLASSIFIED. The fires for the period covered by this report have been classified according to size and cause, as shown in the following table. For a complete list of fires see the appendix.

	1920	1921
Number of fires $\frac{1}{4}$ acre or less.....	7	242
Number of fires $\frac{1}{4}$ to 10 acres.....	41	182
Number of fires over 10 acres	24	39
Total	72	463
Number of fires by causes:		
Railroads	7	176
Lightning		3
Brush burning*	22	68
Campers**	23	114
Incendiary	1	8
Lumbering***	2	6
Miscellaneous****	1	6
Unknown	16	82
Total	72	463

The fires under the heading "Campers" can be further classified as follows:

	1920	1921
Smokers	11	42
Camp fires	2	15
Others	10	57

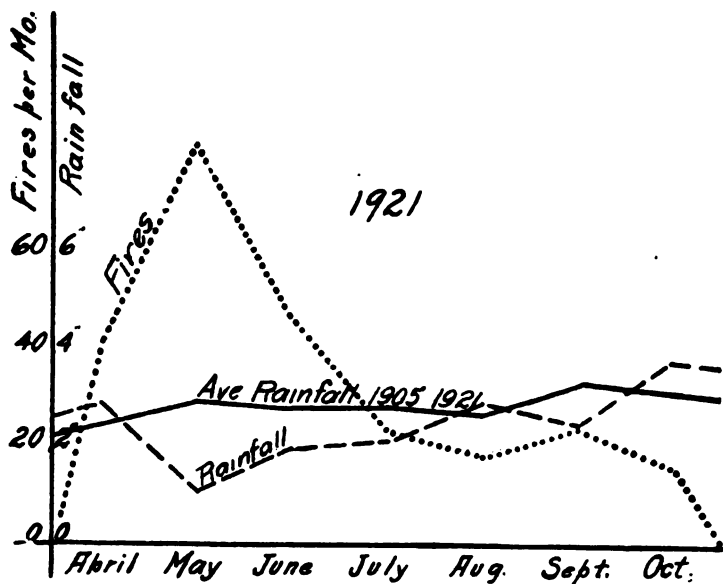
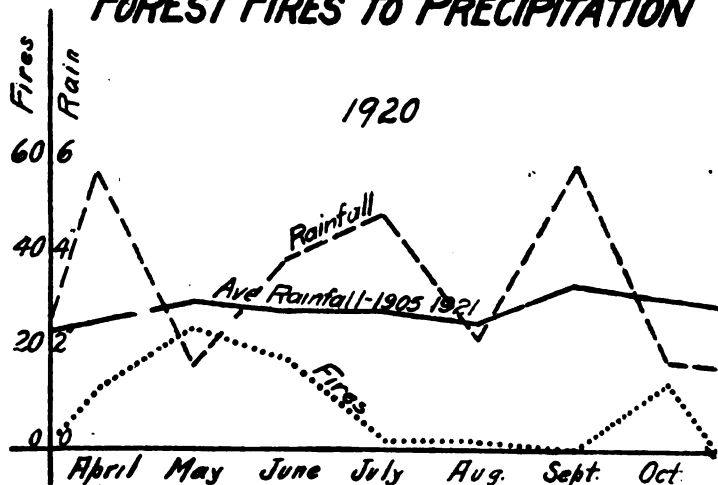
*Includes all fires reported as having been caused by burning brush to clear land, along roads, burning pasture, etc.

**Includes abandoned camp fires, fires caused by smokers, hunters, fishermen and others traveling through the woods.

***Includes all fires from lumbering operations, including sparks from saw mills.

****Cause known but cannot be classified under any of the headings preceding.

RELATION OF FOREST FIRES TO PRECIPITATION





Of the fires classified under "Others" a number are charged to hunters and fishermen. It is probable that many if not most of the fires under the classification "Others" could be properly classified under one or the other of the first two headings. There is certainly sufficient evidence available to demonstrate that the careless smoker is a much greater menace to our woodlands than is the man who forgets—or neglects—to put out his camp fire.

The number of fires started by the burning of brush for various purposes is evidence that those who do this burning do not take all the precautions necessary to prevent their fire getting away. The most common of faults seem to be:

1. Burning when it is too dry or too windy.
2. Taking no precautions to prevent or retard the spread of fire, such as building fire lines, piling brush in piles, etc.
3. Starting fires in more places than the available help can care for properly.
4. Leaving a fire while it is still smouldering. Often a wind comes up and the fire gets away.

The large number of railroad fires in a dry season such as 1921 indicates that the locomotives are not properly provided with spark arresters and ash pans to prevent them from throwing sparks and hot coals. Vermont is one of the few, if not the only timber state having no laws requiring railroads to equip their rolling stock with fire arresting devices. Although the patrolmen, whom we maintain at dangerous sections of the railroad where grades are heavy, were able to extinguish most of these railroad fires while they were very small, it was only by the exercising of extreme diligence that this was accomplished. As long as the menace exists there will be danger that bad fires may start. The only satisfactory solution of the problem is the removal of the cause by requiring through proper legislation, the installation of safety devices to prevent locomotives from throwing fire from their smoke stacks and ash pans.

The fires for the calendar biennium have been further analyzed and tabulated by cost, damage and area, and a comparison of 1918, 1919, 1920 and 1921 is made in the following table:

	1918	1919	1920	1921
Total number of fires	53	68	72	463
Number extinguished with little or no damage	34	51	45	356
Total area burned over (acres)	2617	824	2222	2256
Average area per fire (acres)	49	12	31.3	5.0
Total cost of fighting fires	\$ 582.00	\$1,009.00	\$ 1,267.00	\$ 4,409.00
Average cost per fire	10.98	16.01	17.87	9.52
Area burned on which it was reported that no damage occurred	702	496	682	958
Area burned on which it was reported that damage occurred	1905	378	1540	1353
Total damage	\$ 3,095.00	\$2,919.00	\$11,350.00	\$13,455.00
Average damage per fire	58.40	42.92	169.85	29.06
Total loss (cost plus damage)	3,677.00	3,928.00	12,617.00	17,864.00
Average loss per fire	69.38	57.76	175.24	38.58
Number of towns reporting fires	32	42	57	120

CUMULATIVE DATA ON FOREST FIRES.

Year	Fires	Area Burned		Cost		Damage		Loss		Period of Greatest Danger
		Total	Ave.	Total	Ave.	Total	Ave.	Total	Ave.	
1908	106	15894	150	\$10,769.00	\$101.00	\$31,195.00	\$294.00	\$41,964.00	\$395.00	Oct
1909	25	570	23	280.00	11.00	985.00	39.00	1285.00	50.00	Aug
1910	43	341	8	471.00	11.00	1,035.00	25.00	1,506.00	36.00	Apr
1911	70	4624	66	2,995.00	43.00	9,661.00	138.00	12,656.00	181.00	May
1912	32	1118	35	4,013.00	125.00	1,900.00	60.00	5,915.00	185.00	July
1913	167	5635	34	3,116.00	19.00	9,847.00	59.00	12,963.00	78.00	May
1914	137	4058	30	3,368.00	25.00	8,619.00	62.00	11,987.00	87.00	May
1915	137	4397	32	4,300.00	25.00	8,617.00	62.00	12,917.00	87.00	Apr
1916	42	812	20	4,177.00	99.00	7,340.00	56.00	11,517.00	155.00	May
1917	38	525	13	3,244.00	85.00	966.00	26.00	4,210.00	111.00	May
1918	53	2617	49	582.00	11.00	3,095.00	58.00	3,677.00	69.00	Apr
1919	86	824	12	1,009.00	16.00	2,919.00	43.00	3,928.00	58.00	Aug
1920	72	2222	31	1,267.00	18.00	11,350.00	157.00	12,617.00	175.00	May
1921	463	2256	5	4,409.00	10.00	13,455.00	29.00	17,864.00	39.00	May
Ave	104	3278	31	3,143.00	30.00	7,927.00	76.00	11,070.00	106.00	May

COMPARATIVE DATA. The accompanying chart and table show the fire seasons of 1908 to 1921, inclusive, compared as to number of fires, area burned, cost to extinguish, and damage. In the table both the totals and averages per fire are shown. In the chart the area, cost and damage is shown as the average per fire. The "average per fire" is a better indicator of the effectiveness of the suppression organization than is the total.

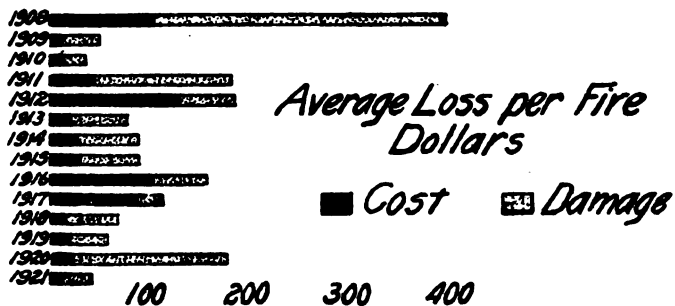
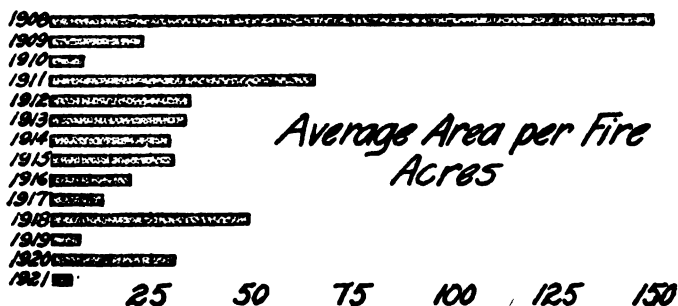
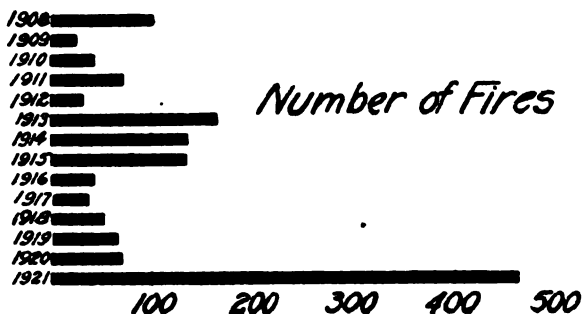
Fairly satisfactory results are shown in the suppression work. In general the average area, cost and damage figures are growing smaller, showing the result of quicker, more decisive action on fires. The figures and graphs showing the number of fires, however, show that more work must be done in fire prevention. With the increasing use of the woods for recreation there is bound to be an increasing number of fires caused by careless pedestrians unless greater preventive measures are taken. It is also necessary to reduce the number of fires from other causes. This can be accomplished by a persistent and insistent fire prevention campaign.

CONCLUSION. The outstanding feature of the 1921 fire season, when compared with the three preceding ones, is in the number of fires, which is a fairly conclusive indication of the relative severity of the several seasons. The drier the season the greater will be the number of sparks that develop into fires. The activity of the patrolmen was largely responsible for the large number of fires found and extinguished while only spots.

Considering the season, much more satisfactory results were secured in fire suppression in 1921 than in the other three years shown in the table. In 1920 the results do not appear very satisfactory from the view point of area burned, cost or damage. These large figures do not indicate, however, a general "letting down" all over the State but are a result of four particularly bad fires which covered considerable area and did considerable damage. The worst one was in Woodford and burned over eight hundred acres with a reported damage of \$6,000.

It is very noticeable that the area burned and the damage are very little greater in 1921 than they are in 1920 in spite of the much greater number of fires and the much drier summer. Much of the success in keeping down the area and damage is due to the heavier patrol and lookout service put on by the State and co-operating agencies, as well as the greater vigilance and activity of the fire wardens.

COMPARATIVE FIRE DATA 1908 to 1921



WHITE PINE BLISTER RUST CONTROL

PRESENT CONDITIONS. All attempts to stamp out the White Pine Blister Rust disease were abandoned in the spring of 1920, because of the general prevalence of the disease on both the white pine and ribes, and all efforts thereafter have been directed toward its control on areas of immature pine. To successfully accomplish this control three general projects or lines of attack have been developed, namely:

1. EDUCATION.

- A. Personal interviews with pine owners.
- B. Circularization of 800 pine owners, enclosing Federal and State bulletins and pamphlets.
- C. Posting of all railroad stations in white pine sections.
- D. Lectures, magazine and newspaper articles.
- E. Exhibits at State and county fairs.
- F. Showing of motion picture film, "The Story of the White Pine," at about forty motion picture houses and at various places about the State and at several meetings.
- G. Co-operation with the Extension Service and through them with all the County Agents.

2. TYPE MAPPING.

This is a continuation of a project started in previous years, its object being to locate the white pine of various ages and also to locate other forest types as well as cultivated and pasture lands. With this map as a basis a comprehensive plan can be formulated for the protection of all the pine of the State.

3. ERADICATION OF CURRANT AND GOOSEBERRY BUSHES.

Here the owner of the pine was required to pay the cost of eradication with the exception of equipment, etc., and the excess wage paid to experienced men over and above regular day labor wages. The latter was paid from State and Federal co-operative funds, and amounts to 7% of the whole cost.

The more or less skeptical attitude of the public toward the Blister Rust work in previous years has changed considerably for the better. This is due to several causes, chief of which is the wide publicity given the work throughout the State. Another contributing factor to this change in attitude is the increased amount of infection becoming apparent each year. A third factor is the increased price of white pine due to its scarcity and to the rapidly declining supply of all timber.

EDUCATION. The Forestry Department is making every effort to acquaint the public generally, and the pine owners in particular, with the nature of the Blister Rust disease. It is emphasizing the seriousness of the danger and is demonstrating preventive measures. Personal interviews have been held with many pine owners and letters of warning have been sent to about eight hundred owners of white pine throughout the State. Colored pamphlets were also mailed showing the disease in its three stages and describing preventive measures. All railroad stations in the white pine sections were posted with large colored display cards. Exhibits were placed at the State Fair at White River Junction, and at various county fairs including those at St. Johnsbury, Rutland, Essex Junction, Sheldon, Tunbridge and Manchester. A motion picture film entitled, "The Story of the White Pine" was purchased and shown at various educational meetings and in motion picture houses about the State. These included Barnet, Bellows Falls, Bethel, Brandon, Brattleboro, Cavendish, Chester Depot, East Highgate, Franklin, Hardwick, Hartland, Hyde Park, Middlebury, Montpelier, Morrisville, Newbury, Northfield, Pittsford, Proctor, Proctorsville, Rutland, St. Albans, St. Johnsbury, Sharon, Sheldon, So. Royalton, Springfield, Swanton, Wallingford, Wells River (Woodsville) Weston, White River Junction, Windsor and Woodstock. In some of these places there was more than one showing and in many there was some newspaper publicity preceding the picture. A paper was read at the Unitarian Church in Montpelier to accompany a showing of the film, and the film was loaned to Norwich University and to a forestry class in Pittsford.

The type mapping has progressed satisfactorily, one hundred thirty-eight towns being now completed, fifty-nine of which were done during the calendar year 1921. Practically all of the natural white pine area has been mapped, and in all about 56% of the State has been covered.

ERADICATION. During the 1920 eradication season the ribes were eradicated from thirty-seven separate areas, twenty-nine of which were on private land. During the season of 1921, there were thirty-two separate areas covered, thirty of which were private jobs.

A brief summary of the eradication work for the two seasons included in this report follows:

Year	No. Acres	No. Areas	No. Ribes	Per Acre Cost	Total Cost
1920	4,500.5	37	36,368	\$.75	\$3,391.60
1921	6,317.1	32	60,147	.548	3,471.26
Biennium	10,817.6	69	96,515	.677	6,862.86

Class of	Wages	Expenses	Total
State Expenditures*	\$ 4,405.58	\$7,598.25	\$12,003.83
Federal Expenditures	11,296.48	223.48	11,519.96
Total	\$15,702.06	\$7,821.73	\$23,523.79

Administration	\$ 917.83	\$ 591.88	\$ 1,509.71
Supervision	2,705.62	1,321.43	4,027.05
Eradication	5,369.62	839.51	6,209.13
Field Data**	5,260.40	3,354.49	8,614.89
Education***	1,205.50	1,680.73	2,886.23
Miscellaneous	243.09	33.69	276.78
Total	\$15,702.06	\$7,821.73	\$23,523.79

*Note. State expenditures include money spent by private parties when the work is done under State supervision.

**Note. Field data include money spent on the Type Mapping work described elsewhere.

***Note. Education includes effort to secure local co-operation.

ERADICATION DATA SEASON OF 1920.

Name of Area	Township	Man Hrs.	Acres	COSTS			Number of Ribes Pulled	PER ACRE VALUES							
				Labor Costs		Transportation		Total Cost	Cost to Coop.	Labor		Total Costs	Coop. Costs	No. of Ribes Pulled	
				Pvt.	State					Pvt.	State				Tot.
1 West River	Townshend	128	100	72.50	72.50	10.71	487	832.1		.725	.725	.832		4.87	
2 Mendon	Mendon	104	70.25	58.25	58.25	8.70	238	66.95		.827	.827	.951		3.38	
3 Lyndon	Lyndon	68	50	38.85	38.85	5.63	69	44.48		.777	.777	.889		3.38	
4 Groves	Woodbury	4	75	1.75	1.75	30	175	250		.023	.006	.029	.023		
5 Stevens Block 1	Enosburg	1000	525	567.36	567.36	82.20	5990	649.50		.1078	.1078	1.031		11.38	
6 Stevens Block 2	Enosburg	194	100	19.00	19.00	16.25	1360	110.25	75.00	.750	.190	.940	1.102	7.50	
7 R. R. Jones Forest	Plainfield	296	258	148.00	148.00	24.75	1116	172.75		.574	.574	.670		4.33	
8 West Rutland Forest	West Rutland	685	336.35	384.03	384.03	51.50	4584	435.53		1.624	1.624	1.842		19.39	
9 Uley	Cabot	167	85	16.25	16.25	13.90	3147	106.92	41.00	.1088	.1088	.746		4.33	
10 Mt. Sanatorium	Pittsford	262	240	145.59	145.59	21.90	2169	162.49	115.59	.808	.104	.585	.676	3.68	
11 Billings	Pittsford	72	200	31.50	31.50	6.00	866	44.50	72.00	.481	.157	.035	.222	1.57	
12 Fox	Pittsford	9	150	3.93	3.93	7.5	302	5.68	3.93	.006	.006	.037		1.02	
13 Candon	Pittsford	16	75	7.00	7.00	1.33	12	9.98	7.00	.003	.003	.022		.093	
14 Proctor	Proctor	138	100	60.59	60.59	11.82	973	85.81	60.59	.606	.134	.740	.858	9.73	
15 Fortage	West Rutland	72	50	31.50	31.50	6.00	307	44.50	37.50	.630	.140	.770	.860	9.73	
16 Willis	Pittsford	32	100	14.00	14.00	2.67	316	19.87	14.00	.032	.172	.198	.140	3.16	
17 Fisher	Arlington	144	54	72.00	72.00	12.00	451	98.00	72.00	1.332	.259	1.591	1.813	3.16	
18 Graves	Sunderland	4	30	1.75	1.75	2.20	16	2.50	1.75	.058	.014	.072	.83	1.75	
19 Stearns	Lincoln	16	85	8.00	8.00	1.33	10	10.93		.093	.018	.111	.127	1.87	
20 Chas. Downer Forest	Sharon	532	98	252.05	252.05	34.40	5907	287.05		2.526	2.526	2.87		8.59	
21 Verges	Wegons	860	455	475.15	475.15	70.70	3923	545.85		.997	.997	1.146		8.23	
22 West Fairlee	West Fairlee	96	25.50	55.81	55.81	8.00	13	63.81		.212	.212	.242		.049	
23 Bellows Falls	Bellows Falls	16	135	1.60	1.60	1.33	227	10.43	3.50	.0555	.0118	.067	.077	1.67	
24 Hartness	Springfield	35	273	15.30	15.30	2.97	409	21.91	15.30	.058	.012	.07	.055	1.67	
25 Bishop	Springfield	2	small	1.00	1.00	1.17	12	1.37	3.50	.145	.028	.173	.200	1.10	
26 Hildreth	Brattleboro	14	45	6.56	6.56	1.17	50	9.93	3.50	.056	.017	.102	.111	1.07	
27 Wright	Westminster	14	80	7.00	7.00	6.36	51	9.53		.056	.010	.066	.075	.637	
28 Holden & Martin	Dummerston	16	130	8.00	8.00	1.30	21	10.85		.18	.036	.216	.243	1.47	
29 Woolson	Springfield	4	115	No Report	No Report					.18	.036	.216	.243	.637	
30 French	Springfield	4	50	2.00	2.00	.30	27	2.70		.08	.016	.096	.109	1.47	
31 Blair	Westfield	4	50	2.00	2.00	.30	27	2.70		.08	.016	.096	.109	.637	
32 Dickenson	Dummerston	4	small	2.00	2.00	.30	27	2.70		.08	.016	.096	.109	.637	
33 Richardson	Brattleboro	5	85	2.30	2.30	.41	22	3.41	1.75	.0292	.0058	.035	.039	.32	
34 Burrows	Brattleboro	8	85	1.30	1.30	.25	48	2.05		.0292	.0058	.035	.039	.32	
35 Fishers (Westmins.)	Brattleboro	8	small	4.00	4.00	.85	1055	5.45		.0187	.0037	.0225	.03	.34	
36 Country Club	Westminster	100	135	47.75	47.75	7.00	1055	64.75	29.75	.353	.074	.427	.479	3.35	
37 Vermont Marble Co.	Fair Haven & Windham & Grafton	32	200	16.00	16.00	2.60		21.70		.08	.015	.095	.108	1.12	
		5,172	4,501	10,765.19	2,047.55	2,813.04	74	3,224.45	15,612.9458	.1699	.4546	.7188	1.145	6.54	

ERADICATION DATA—SEASON OF 1921.

Area	Township	Acres	Man hours	COSTS				Ribes Pulled		PER ACRE VALUES						
				Common labor	Excess labor	Total labor	Trans- por- ta- tion	Total Amount	Cooper's Cost	Wild	Cult.	C Labor	E Labor	Total Labor Amount	Cooper's Cost	Wild Ribes
Stowe Co. Albin Newfane Windor Davis Springfield Merrifield Newfane Townsend Newfane Pittsford Bellows Falls Ure Windsor Stark Village Middlebury Windsor Thompson Brattleboro Windsor Springfield Brattleboro Pittsford Marble Pittsford Dummerston Forest Windsor Newfane Williams Springfield Village Woodstock Hall Chester Village Dummerston Tyson W. Rutland Forest Brattleboro Brattleboro Brattleboro Brattleboro	92	111	42.08	2.32	44.40	.00	44.40	42.08	434	19	.467	.026	.493	.467	5.87	
	200	188	71.75	6.75	78.50	.00	78.50	71.75	3,710	3	.359	.033	.392	.359	18.52	
	318.57	138	51.60	3.25	54.85	21.25	80.93	76.85	665	0	.174	.010	.184	.251	2.09	
	640	492	188.65	11.75	200.40	10.60	211.00	199.25	1,997	0	.294	.018	.313	.329	3.10	
	160	99	43.31	6.19	49.50	1.50	51.00	44.81	808	0	.271	.039	.309	.318	2.80	
	45	6	2.62	.38	3.00	.00	3.00	2.62	11	0	.058	.008	.066	.058	.24	
	87.75	20	7.03	.31	8.24	1.25	9.49	9.18	34	0	.096	.004	.094	.108	.39	
	190	80	34.00	5.01	40.00	8.75	48.75	43.74	583	0	.184	.026	.210	.256	3.07	
	150	31	13.56	1.44	15.00	6.25	21.25	19.81	53	0	.090	.009	.100	.142	.35	
	70	36	15.75	2.25	18.00	4.50	22.50	20.25	351	0	.225	.032	.257	.321	5.00	
	231	148	52.00	9.00	61.00	.00	61.00	52.00	2,536	0	.225	.039	.264	.264	8.88	
	191	147	52.40	9.36	61.76	.00	61.76	52.45	1,699	0	.274	.049	.323	.323	27.4	
325	555	225.07	14.00	239.07	2.66	241.73	227.72	7,846	5	.692	.043	.735	.743	70.1		
57	15	6.78	.97	7.75	2.50	10.25	9.28	134	0	.119	.017	.136	.179	25.37		
225	48	21.00	3.00	24.00	.00	26.00	23.00	806	0	.093	.013	.107	.116	3.58		
23.50	18	7.87	1.13	9.00	1.50	10.50	9.37	10	0	.334	.048	.383	.446	4.00		
914.	3080.5	1172.88	77.00	1249.88	30.00	1279.88	1202.88	22,674	74	1.283	.084	1.367	1.400	1.316	24.80	
183.70	497.5	179.14	14.14	193.28	10.00	203.28	189.14	1,689	0	.075	.077	1.052	1.095	1.029	9.14	
44	14	6.12	.88	7.00	.00	7.00	6.12	No Report	0	.139	.020	.158	.158	.139	NO RPT	
100	92	36.59	1.51	38.10	7.00	45.10	43.59	147	0	.366	.015	.381	.451	.435	4.47	
158	132	50.70	.00	50.70	12.50	63.20	63.20	326	0	.321	.000	.321	.400	.400	2.06	
57.50	56	22.14	.16	22.30	2.50	25.40	24.60	588	0	.385	.013	.398	.441	.428	10.22	
210	218	84.18	5.62	89.80	6.25	96.05	90.43	546	0	.401	.026	.428	.457	.430	2.60	
375	38.5	16.84	2.41	19.25	7.00	26.25	23.84	187	30	.046	.006	.051	.070	.064	4.97	
100	31.5	13.77	1.98	15.75	.00	15.75	13.77	161	0	.137	.020	.157	.157	.137	1.61	
73	13	5.68	.82	6.50	3.75	10.25	9.43	51	0	.078	.011	.089	.140	.129	.70	
257	181	64.55	11.25	75.80	.00	75.80	64.55	2,113	0	.251	.044	.295	.295	.251	8.22	
83.50	45	19.69	4.81	24.50	2.00	26.50	21.69	833	0	.237	.058	.293	.317	.259	9.97	
271.60	1200	476.32	25.99	502.31	7.00	509.31	483.32	7,003	0	1.754	.085	1.848	1.875	1.778	26.00	
286	169	73.94	10.50	84.50	12.28	96.78	86.22	1,645	0	.258	.037	.295	.338	.301	5.75	
90	11	4.81	.69	5.50	1.78	7.28	6.59	31	0	.053	.008	.061	.081	.073	.34	
110	4.5	1.97	.28	2.25	.00	2.25	1.97	16	0	.018	.002	.020	.020	.018	.15	
6,317.12	7,924.5	3,070.68	235.76	3,306.44	164.82	3,471.26	3,235.50	60,147	131	.486	.037	.523	.548	.511	9.55	

RECREATIONAL FORESTRY

DEFINITION. This division of forestry includes the fostering of all the recreational activities of out of doors life: trail building to aid and encourage mountaineering, the development of road side camp sites for tourists, the establishment and maintenance of mountain parks; it includes the beautification of road side and villages through co-operation with the town tree warden in his work along the open road, and with the town fathers in their desire to improve the natural attractions of the village green; it includes the enforcement of laws regulating the catch and kill of fish and game, their propagation and protection, and the administration of the state's wild-life property in the woods and streams.

CURRENT OPINION. "The tendency nowadays to wander in wildernesses is delightful to see. Thousands of tired, nerveshaken, overcivilized people are beginning to find out that going to the mountains is going home; that wilderness is a necessity, and that mountain parks and reservations are useful not only for fountains of timber and irrigating rivers, but as fountains of life."—John Muir.

"The shores of Lake Champlain do not seem likely to be the chosen home either of any great agricultural, or any great manufacturing industry. ***** More and more will the Green Mountains ***** be the place to which men will come from those crowded regions, ('the gigantic cities') to seek rest and health and recreation, and the joys of unspoiled nature. One who foresees such a future, and who himself loved nature would counsel you to ***** suffer none of the finest gifts of nature to be lost by any want of foresight."—Lord Brice, at the Champlain Tercenary Celebration, 1909.

"A convincing example of the practical utility of efforts to do away with what is ugly and to substitute therefor beauty and order, is afforded by the wonderful transformation of Paris under the Second Empire. ***** Not only in Paris but in rural France also we can note the advantage of striving rather to enhance than to diminish natural beauties, for it is well known that, no matter how poor a Frenchman's village may be, it is so beautiful that few Frenchmen ever leave home. It seems almost unnecessary to allude to the care taken of every beautiful site in England, Italy,

Germany, Holland, and Switzerland, and these countries receive a full pecuniary reward for the attention bestowed upon such matters, although this may not be the sole and only object in view".—Dr. Geo. F. Kunz, President American Scenic and Historic Preservation Society.

This is the intangible side of forestry. It is also the side which needs most careful and extended fostering. Already the Andirondacks and the White Mountains are reaping a rich harvest due to the foresight of the people in those sections. Nature has been no less lavish with her gifts of graces to Vermont but these must be enhanced rather than diminished. A generation of careful planning and execution to enhance the State's natural attractions will yield more direct returns in money to Vermonters as a whole than will any other division of forestry.

ACTIVITIES. Some phases of recreational forestry are being developed by the State of Vermont through the action of the forestry, publicity, and fish and game departments, while other phases are neglected to the certain detriment of the people of Vermont. Within the past ten years the Green Mountain Club in co-operation with the forestry department has constructed and is maintaining approximately two hundred fifty miles of trail in the Green Mountains. Along this trail has been erected co-operatively by these agencies and through private assistance some ten or more lodges which offer shelter for the night to pedestrians many of whom come from distant states to regain their health and strength. The trail and shelters are used by Vermonters, however, as well as by outsiders and our own people find in this means of recreation a delightful diversion from their daily tasks. The Long Trail is becoming more popular each year.

Elsewhere in this report is described under the caption "Special Uses" the activities of the department relative to the number of camp sites on the several state forests now occupied by vacationists.

Many inquiries are made of the forestry department and advice given concerning the treatment of lawn and street trees; the forestry department lent its influence at the 1921 session of the legislature in securing the passage of an act preventing the wanton destruction of some of our rarest native plants; the forestry department took the initial step causing several miles of stream on its state forests to be posted against fishing and thus created a spawning ground to serve to stock the lower streams with fish for anglers.

FOREST UTILIZATION

DEFINITION. The aim of this division of forestry is to insure complete utilization of the products of the forest, especially wood and water, and to insure that revenues derived from stumpage shall equal or exceed the cost of timber production. It aims also to build up permanent wood working industries at home, to give permanent local employment, to develop rural life conditions about a small industrial centre as a unit. The work within the field of forest utilization is an extremely important function of government.

CURRENT OPINION. "And now, first and foremost, you can never afford to forget for one moment what is the object of our forest policy. That object is not to preserve the forests because they are beautiful, though that is good in itself, nor because they are refuges for the wild creatures of the wilderness, though that, too, is good in itself; but the primary object of our forest policy, as of the land policy of the United States, is the making of prosperous homes. It is part of the traditional policy of home making of our country. Every other consideration comes as secondary. The whole effort of the Government in dealing with the forests must be directed to this end, keeping in view that it is not only necessary to start the homes as prosperous, but to keep them so. That is why the forests have got to be kept. You can start a prosperous home by destroying the forests, but you cannot keep it prosperous that way ***** Forestry is the preservation of forests by wise use."—Theodore Roosevelt.

"It is not enough for President Roosevelt to create one hundred fifty-five million acres of National Forests in which the Federal Government might embark in the business of timber production. It was equally necessary to build up a practical *science of wood use*—how to utilize the enormous quantities of *waste* material in our forests and saw mills; how to reduce manufacturing losses and better the methods of employing wood in the infinite number of American industries which require it. The Forest Products Laboratory was built by men who know that to answer these questions and others like them was as necessary as to stop forest fires. And they not only built the Laboratory as an efficient unit of itself; they built it into and made it part of one of the most virile and far-sighted movements toward using natural

resources for national efficiency in the long run that the world has ever witnessed."—Colonel W. B. Greeley, Chief Forester, U. S. F. S.

The Forest Products Laboratory is maintained at a cost to the nation and its co-operators of nearly a million dollars a year, and the results of its investigations are available to Vermonters if we but make use of them. That is why a high grade assistant forester in forest utilization is needed in Vermont. It would be his duty to act as a go-between, bringing the work of this excellent experimental laboratory to our own manufacturers using wood as a raw product. This is as truly a function of government as is any form of education. It has been conservatively stated that such an assistant through his services could double the net income of our wood working factories within a decade, and the additional profits would find their way back to the stump to the benefit of the land owner.

To carry out this class of work would require a state appropriation equal to the salary and traveling expense of one man and a suitable allowance for stenographic service and printing—possibly \$5,000. in addition to that now spent in that direction. The first year's work of this assistant forester would be very largely an inventory of our wood using industries and could be charged jointly against the publicity fund and the forestry department.

ACTIVITIES. All that the present personnel finds time to do in this neglected field is to answer a few inquiries about lumber prices, markets, stumpage values, etc. For one year the department circularized the wood working establishments weekly bringing to their attention the conditions of the market as reflected in trade journals but more particularly digesting for them the publications of the above described Forest Products Laboratory applicable to Vermont mills. The work became too burdensome for our present personnel and was dropped.

MISCELLANEOUS TOPICS

PUBLICATIONS. During the fiscal biennium four numbered bulletins were printed (Nos. 23, 24, 25, and 26) and several unnumbered leaflets were published. Each of these was given a wide distribution. Chief among them were two booklets issued as instructions to Fire Wardens, one leaflet printed in color describing the White Pine Blister Rust and methods of control, two pamphlets dealing with forest plantations as an investment, and a number of minor cards, forms, etc. of transient importance.

EXHIBITS. In the fall of 1920, and again in 1921, the Forestry Department was represented each year at four of the County Fairs as well as at the State Fair. In each case an exhibit was shown of an educational nature calling attention to the need of protecting the forests against the ravages of fire, insects, and diseases. Also, an effort was made at these fairs to stimulate reforestation. On one occasion an attempt was made to put the whole scheme of Rotational Regulation before the people through the operation of a machine constructed of revolving shafts, gears, cams and moving tables which supported thousands of artificial trees. These tables, one for each year in the rotation, moved upward slowly and caused the trees to grow. When these had reached their full height the table, through the action of a cam, suddenly receded, representing the harvest of that particular stand of timber. Naturally the cams were so timed on the shaft that no two stands of timber came to maturity at the same time. Also, it was so arranged that when the last stand was cut the first area to be harvested had again produced a crop of mature timber. Thus sustained annual yield resulted.

PUBLIC ADDRESSES. The Chief Forester has been called upon repeatedly for lecture work and has responded freely. Other members of the forestry staff have also delivered lectures on various forestry subjects.

CONFERENCES. During the past two years, more than at any other time in the history of the forestry movement, the whole matter of an adequate forestry policy for the nation—we have none at present—has been agitated from one source or another to such an extent that a large number of very important conferences of state foresters and professional foresters outside of state or national work have been called for the purpose of clarifying ideas and formulating a sane forestry policy for the nation. At these con-

ferences Vermont has been represented. The cost in travel has not been burdensome but the cost in time devoted to these conferences, particularly in digesting reports and preparing counter statements, has been burdensome. The results obtained, however, seem to justify the effort.

WOODLOT FORESTRY. During the fiscal biennium thirty-one field trips were taken by the Chief Forester in response to requests for advice in handling woodlands. At these meetings actual woods conditions were investigated in company with the owner of the land. In addition to this extension work done by the Chief Forester similar work has been done by other members of the Forestry Department. Literally several hundred farms have been visited and the owners counseled concerning some phase or other of forestry work.

FORESTRY ASSOCIATION MATTERS. In January, 1922, at the request of the Acting President of the Vermont Forestry Association, Mr. Amos J. Eaton, of South Royalton, the Chief Forester addressed those present at a special meeting called to take action on the formal disbandment of the Association. In his talk he outlined the working details of an association or Council of Allied Interests to take the place of the Forestry Association. These details in brief suggested the periodic calling together of delegates from many already existing organizations whose activities are closely allied to or embody some branch of forestry. Such organizations include among others the chapters of Fish & Game League, the various Pomona Granges, the chapters of the Women's Clubs, the County Farm Bureaux, the Chambers of Commerce, and a few delegates at large appointed by some suitable authority. The suggested idea of a forest council or congress was received well and a committee appointed with powers to call such an organization into being and provide for a gathering of the newly created organization at the time and place of the Dairymen's Association meeting in the winter of 1923. The committee appointed consists of Hon. Mason S. Stone, Hon. Franklin S. Billings, Dean Pearl Randall Wassan, Mrs. George Chaffee, and W. G. Hastings, Chairman.

A resolutions committee was appointed by the presiding officer and the following resolutions pertaining to the immediate work of the association were adopted:

"RESOLVED: By the members of the Vermont Forestry Association, in meeting assembled at Burlington, Vermont, January 11, 1922: That the present Association be and is hereby declared disbanded; its Officers discharged;

and its Treasurer authorized to return to the donors the contributing and sustaining funds received during the past fiscal year, and instructed to turn over to the Treasurer of any organization which now or hereafter may be formed in the State in the interests of Forestry any residue of funds remaining in his hands, together with all books, papers, property, etc. belonging to the Association.

RESOLVED: That it is the sense of this meeting that the action above indicated should not be held to imply any lack of interest on the part of our membership in forestry per se, but rather to be an evidence of its desire so to re-shape the present organization, or to replace it by some other, that the interests of forestry may be better served.

We are mindful of the fact that during the past week one of the founders of the Association, one who from its inception in 1904 to date has been an officer, first its Secretary and for many years its President, has passed from this life.

Ernest Hitchcock was for six years a member of the State Board of Agriculture, and for some years a Cattle Commissioner; was by virtue of his relationship to the Board of Agriculture the first State Forester and was for many years President of the Rutland County Farm Bureau; a prominent, successful and typical Vermont farmer. His given name fitted him. Earnest in all his work, he was a cogent reasoner, an effective speaker, a strong advocate, a constructive organizer, a potent force in the movement which placed forestry where it now stands in this state. We shall miss his counsel." "A true copy, J. E. Riley, Sec'y."

NEEDED LEGISLATION. Many requests for seedling trees to be used for ornamental purposes reach the Forestry Department. The laws, however, do not permit the sale of our nursery stock for ornamental purposes until it is clearly known to be "surplus material." Many prospective purchasers are therefore disappointed when nursery stock is refused them. The basic law upon which the State nurseries are operated should be amended to permit the sale of nursery stock for ornamental purposes at the same price per 100 plants that is charged per 1000 plants for reforestation. Such an amendment would permit the Forestry Department to appeal to a wider circle of land owners and through them stimulate tree planting for forestry purposes. It would also permit the department to stimulate interest in road side beautification.

Trouble has been experienced at times in securing some one to take the office of town fire warden. The law should be so amended that the chairman of the board of selectmen shall by virtue of his office be town fire warden unless and until a regularly appointed warden has been chosen. The present law requiring that the owners of wild land provide such land with suitable protection is not adequately worded to secure to the State the benefits of Federal appropriations based on State expenditures. The law should be worded so that not less than one cent or more than two cents per acre shall be assessed against all land in the State to be used for protection against forest and field fires. This will be no more costly to the land owners than the present law and will put Vermont on an equal footing with Maine and New Hampshire in the matter of forest protection.

There is too much guess work concerning the quantity of forest products taken from our forests annually. A law should be enacted requiring the forester to take a census of the wood using industries each year, as is done in other states, and as is done in Vermont for the butter and milk industry, the maple sugar industry, etc.

New Hampshire at its last session of the legislature enacted several far reaching measures pertinent to forestry. In one it provided for districting the state, the employment of district foresters and the supervision of much if not all of the forestry work of the department by these district men. In another law it is required under certain conditions that seed trees be left standing, which brings a new principle of law into being. If this principle can be successfully maintained when assailed on the grounds of constitutionality, then any future legislature can require even more intricate forestry practices. In still another law the principle of obligatory slash disposal has been incorporated. A fourth measure of note is a law which requires the expenditure of one cent per annum by land owners for forest protection, and provides in case of failure of the land owner to do so that the State forester shall provide such protection and charge the cost thereof to the owner of the land. The expense to be a lien upon the property.

This latter measure has much to commend it. In Vermont a similar law is needed but would doubtlessly be more effective, under Vermont conditions of low acreage per ownership, if the one cent per acre were assessed and collected by the regular tax machinery of the town and by it transmitted to the State Treasurer to be expended in forest protection by the Forestry Department.

APPENDIX A

PLANTATIONS BY COUNTIES, MADE IN 1921

ADDISON COUNTY

Bristol,	Milton E. Elliott,	1,200 Scotch Pine.
Ferrisburg,	C. S. Martin,	500 Scotch Pine.
Middlebury,	A. L. and H. D. Payne,	100 Scotch Pine,
		100 Norway Spruce.
		200 European Larch.
	E. I. Terry,	2,000 Scotch Pine.
		1,500 Norway Spruce.
		1,500 European Larch.

BENNINGTON COUNTY

Arlington,	J. R. Fisher,	6,000 Scotch Pine.
		1,000 Norway Spruce.
	Mrs. W. F. Smith,	500 Scotch Pine.
Bennington,	A. J. Dewey,	500 Scotch Pine.
		1,500 Norway Spruce.
	Dexter M. Gleason,	5,000 Scotch Pine.
Dorset,	Henry Harwood,	1,000 Scotch Pine.
Manchester,	F. W. Dunbar,	1,000 Scotch Pine.

CALEDONIA COUNTY

Barnet,	D. L. Aiken,	1,000 Scotch Pine.
	Arthur E. Grigg,	2,500 Scotch Pine.
		500 Red Pine.
	Wilbur Nelson,	9,000 Scotch Pine.
		1,000 Red Pine.
		1,000 Norway Spruce.
	Henry G. Roy,	3,000 Red Pine.
Burke,	H. H. Fyler,	500 Norway Spruce.
Danville,	A. A. Daniel,	50,000 Norway Spruce.
		15,000 Red Pine.
Lyndon,	A. E. Heath,	500 Red Pine.
	Milo Houghton,	1,000 Scotch Pine.
	H. L. Parker,	16 Scotch Pine.
		25 Norway Spruce.
		6 European Larch.
Lyndon,	G. T. Ruggles,	1,000 Scotch Pine.
	C. L. Stuart,	100 Norway Spruce.
Peacham,	H. E. Farrow,	3,000 Norway Spruce.
Ryegate,	Peter M. Abbott,	2,000 Scotch Pine.
	William F. Smith,	4,000 Scotch Pine.
St. Johnsbury,	Geo. W. Calbeck,	2,000 Norway Spruce.
	Guy W. Harvey,	1,000 Norway Spruce.
	H. C. and H. P. Stanton,	250 Scotch Pine.
		250 Norway Spruce.

CHITTENDEN COUNTY

Burlington,	Burlington Rendering Co.	2,000	Lodge Pole Pine.
	H. B. Shaw,	500	Scotch Pine.
Milton,	Vermont Fish & Game		
	Preserve	13,000	Lodge Pole Pine.
Westford,	F. E. Wilcox,	500	Scotch Pine.

FRANKLIN COUNTY

Highgate,	R. Anderson,	10	Scotch Pine.
		10	Jack Pine.
		100	Norway Spruce.
St. Albans,	E. S. Brigham,	100	Scotch Pine.
	A. H. Fisher,	1,000	Norway Spruce.
	Mrs. W. E. Fuller,	25	Norway Spruce.
Swanton,	P. J. Farrell,	500	Scotch Pine.
		500	Red Pine.
		500	Norway Spruce.
		500	European Larch.
	Rev. E. M. Total,	12	Scotch Pine.
		12	Lodge Pole Pine.
		12	Norway Spruce.
		12	Japanese Larch.

GRAND ISLE COUNTY

North Hero,	Burlington Y. M. C. A.	2,000	Scotch Pine.
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LAMOILLE COUNTY

Johnson,	L. P. Holcomb,	500	Scotch Pine.
Stowe,	J. D. Talbert,	1,000	Red Pine.

ORANGE COUNTY

Chelsea,	Stanley C. Wilson,	2,000	Scotch Pine.
Newbury,	Harold N. Whitcher,	1,000	Scotch Pine.
Randolph,	E. Kibby,	1,000	Norway Spruce.
	A. D. Reed,	1,000	Norway Spruce.
Thetford,	E. C. Bond,	500	Norway Spruce.
Washington,	Fred C. Waldo,	1,200	Scotch Pine.
Williamstown,	A. A. Reed,	2,000	Norway Spruce.

ORLEANS COUNTY

Newport,	A. Allyn Bishop,	1,000	Norway Spruce.
	William E. Bond,	1,250	Norway Spruce.
Glover,	Bert W. Sherburne,	1,000	Scotch Pine.

RUTLAND COUNTY

Brandon,	Shirley Farr,	2,000	European Larch.
Castleton,	Penrhyn Slate Co.,	1,500	Norway Spruce.
Clarendon,	H. Balch,	1,000	Red Pine.
		1,000	Scotch Pine.
Cuttingsville,	Thomas G. Russell,	1,000	Scotch Pine.
Pawlet,	D. F. and G. F. Robinson,	3,000	Scotch Pine.
Rutland,	F. D. Barstow,	600	Red Pine.
		600	Norway Spruce.
	Forestry Dept., State of		
	Vt.,	40,000	Norway Spruce.
	C. A. Spafford,	2,500	Scotch Pine.

WASHINGTON COUNTY

Barre,	William Barclay,	50 Scotch Pine.
		25 Norway Spruce.
	Willis Venable,	100 Norway Spruce.
Berlin,	T. D. Hobart,	1,000 Scotch Pine.
		1,000 Red Pine.
		1,000 Norway Spruce.
		3,000 Japanese Larch.
Lanesboro,	Forestry Dept., State of	
	Vt.,	20,000 Norway Spruce.
Middlesex,	W. W. Brock,	1,000 Japanese Larch.
		5,000 Norway Spruce.
	J. T. Chapin,	500 Scotch Pine.
		500 Japanese Larch.
Montpelier,	Capital City Gas Co.,	100 Scotch Pine.
		100 Norway Spruce.
	Waldo Farrar,	4,450 Norway Spruce.
		300 Red Pine.
Plainfield,	A. G. Cutler,	250 Scotch Pine.
	W. S. Martin,	2,000 Scotch Pine.
		2,000 Red Pine.
Waitsfield,	E. H. Jones,	2,000 Norway Spruce.
Waterbury,	R. W. Putnam,	1,500 Scotch Pine.
	State Hospital,	2,000 Scotch Pine.
	A. C. Wheeler,	1,000 Red Pine.
		1,000 Japanese Larch.

WINDHAM COUNTY

Jamaica,	Fred A. Ballard,	1,000 Scotch Pine.
Newfane,	A. M. Merrifield,	3,000 Scotch Pine.
Rockingham,	W. D. Bowen,	3,000 Scotch Pine.
	F. L. Smith,	1,000 Scotch Pine.
		1,000 Red Pine.
		1,000 Norway Spruce.

WINDSOR COUNTY

Cavendish,	Leon S. Gay,	2,000 Scotch Pine.
Chester,	John Blodgett,	3,000 Scotch Pine.
		2,500 Norway Spruce.
Hartford,	N. P. Wheeler,	52,000 Scotch Pine.
	R. L. Williams,	50 Scotch Pine.
		50 Norway Spruce.
Rochester,	R. A. Bostwick,	1,000 Norway Spruce.
		500 Scotch Pine.
Sharon,	Forestry Dept., State of	
	Vt.	32,300 European Larch.
Springfield,	Mrs. John T. Slack,	125 Scotch Pine.
		125 Red Pine.
		125 Norway Spruce.
		125 European Larch.
Woodstock,	E. G. Bailey,	200 Scotch Pine.
	Franklin S. Billings,	500 Jack Pine.
	Edward Y. Dana,	1,000 Scotch Pine.
		1,500 Norway Spruce.
	Richard M. Marble,	12,000 Red Pine.
	Elizabeth R. Hall,	500 Norway Spruce.
	Woodstock Acqueduct Co.,	475 Red Pine.
		2,000 Norway Spruce.

APPENDIX B

PLANTATIONS BY COUNTIES, MADE IN 1922

ADDISON COUNTY

Bristol,	John L. Selden,	1,000 Scotch Pine.
Granville,	R. A. Bostwick,	1,000 Norway Spruce.
		500 Scotch Pine.
Middlebury,	Arthur W. Bingham,	3,000 Norway Spruce.
		2,000 Scotch Pine.
	Paul A. Dow,	100 Scotch Pine.
		100 Norway Spruce.
		100 Japanese Larch.
		25 Basswood.
	N. S. Foote,	3,000 Norway Spruce.
	F. D. Manchester,	200 Scotch Pine.
	C. L. Witherell,	1,000 Norway Spruce.

BENNINGTON COUNTY

Arlington,	Mrs. W. F. Smith,	850 Norway Spruce.
	Mrs. G. M. Vaughn,	1,000 Scotch Pine.
Bennington,	A. J. Dewey,	1,500 Scotch Pine.
		2,500 Norway Spruce.
	Dexter M. Gleason,	5,000 Scotch Pine.
		525 White Ash.
	The Orchards,	1,000 Scotch Pine.
		2,000 Norway Spruce
Dorset,	Mrs. L. M. Clarke,	1,000 Scotch Pine.
	Edwin Lefevre,	5,000 Scotch Pine.
		5,000 Norway Spruce.
	Robert A. Shaw,	7,000 Norway Spruce.
Manchester,	Robert Bock,	1,000 Scotch Pine.
	Warner D. Howe,	10,000 Norway Spruce.
	Frank C. Overton,	10,000 Norway Spruce.
Shaftsbury,	J. S. Harrington,	2,000 Scotch Pine.

CALEDONIA COUNTY

Barnet,	Arthur E. Gregg,	100 Norway Spruce.
		200 Japanese Larch.
		700 Basswood.
	Wilbur Nelson,	5,000 Scotch Pine.
		2,000 Norway Spruce.
Danville,	George R. Bagby,	4,000 Scotch Pine.
	Fred W. Clifford,	1,000 Scotch Pine.
	A. A. Daniell,	15,000 Norway Spruce
	Daniell & Wesson,	30,000 Norway Spruce.
Groton,	H. L. Tillotson,	30 Scotch Pine.
Lyndon,	William H. Greene,	1,000 Scotch Pine.
	H. L. Parker,	50 Scotch Pine.
		100 Norway Spruce.
	Mrs. C. H. Stewart,	200 Norway Spruce.
		10 Japanese Larch.
		100 Douglas Fir.
Ryegate,	Peter M. Abbott,	1,000 Scotch Pine.
St. Johnsbury,	Town of St. Johnsbury,	20,000 Scotch Pine.

CHITTENDEN COUNTY

Burlington,	Lyman Allen,	3,000	Scotch Pine.
	C. W. Brownell,	1,000	Norway Spruce.
		500	Scotch Pine.
	Byron N. Clark,	3,000	Scotch Pine.
	H. B. Shaw,	100	Douglas Fir.
		50	Norway Spruce.
		100	Scotch Pine.
		100	Japanese Larch.
Shelburne,	H. Willington,	1,500	Scotch Pine.
	J. Watson Webb,	2,000	Japanese Larch.

FRANKLIN COUNTY

Enosburg,	R. Lloyd Chaffer,	1,000	Norway Spruce.
	B. E. Wilder,	50	Scotch Pine.
		50	Norway Spruce.
Swanton,	F. O. Collins,	1,000	Scotch Pine.
	P. J. Farrell,	1,000	Scotch Pine.
		1,000	Sitka Spruce.
		500	Douglas Fir.
	C. D. Pierce,	250	Scotch Pine.
		250	Norway Spruce.

GRAND ISLE COUNTY

Grand Isle,	Frank Briggs,	100	Norway Spruce.
Isle La Motte,	William A. Hill,	3,000	Scotch Pine.
		1,000	Norway Spruce.
South Hero,	Guy B. Horton,	100	Scotch Pine.
		200	Norway Spruce.
		200	Basswood.

LAMOILLE COUNTY

Stowe,	H. W. Barrows,	10,000	Norway Spruce.
	C. M. Pike,	1,000	Japanese Larch.

ORANGE COUNTY

Chelsea,	O. D. Tracy,	2,000	Scotch Pine.
	F. C. Waldo,	1,200	Scotch Pine.
Fairlee,	Mrs. E. G. Osgood,	1,000	Scotch Pine.
		1,000	Norway Spruce.
Newbury,	Lloyd B. Rogers,	4,575	Scotch Pine.
	A. B. Gay,	500	Scotch Pine.
Randolph,		500	Norway Spruce.
		4,000	Basswood.
	E. F. Kibby,	500	Norway Spruce.
		50	Basswood
Thetford,	E. C. Bond,	1,000	Scotch Pine.
		1,000	Norway Spruce.
		1,000	Basswood.
		500	Oak.
Tunbridge,	Carl G. Howe,	1,000	Scotch Pine.
	Elmer E. Howe,	1,000	Scotch Pine.

ORLEANS COUNTY

Newport, William E. Bond, 500 Norway Spruce.

RUTLAND COUNTY

Brandon, S. R. Kendall, 1,000 Scotch Pine.
 Castleton, William Ayer, 500 Scotch Pine.
 Clarendon, H. Balch, 2,000 Scotch Pine.
 C. A. Spafford, 1,000 Scotch Pine.
 Cuttingsville, O. G. Knight, 1,000 Scotch Pine.
 500 Japanese Larch.
 Thomas G. Russell, 500 Scotch Pine.
 500 Norway Spruce.
 Mt. Holly, Yale Forest School Forest, 37,500 Norway Spruce.
 Rutland, Evergreen Cemetery
 Asso., 1,000 Scotch Pine.
 G. A. Nelson, 3,000 Scotch Pine.
 Wallingford, R. C. Taft, 3,000 Scotch Pine.
 500 Norway Spruce.

WASHINGTON COUNTY

Barre, William Barclay, 50 Scotch Pine.
 50 Norway Spruce.
 25 Japanese Larch.
 Berlin, White Brothers, 7,000 Scotch Pine.
 F. D. Hobart, 1,000 Scotch Pine.
 1,000 Norway Spruce.
 250 Basswood.
 Cabot, S. C. Fisher, 700 White Ash.
 East Montpelier, M. C. Cutler, 250 Scotch Pine.
 George Daniels, 4,000 Norway Spruce.
 Marshfield, J. W. Mears, 1,000 Norway Spruce.
 Middlesex, Burton S. Ward, 2,000 Scotch Pine.
 10,000 Norway Spruce.
 2,000 Basswood.
 Montpelier, W. W. Brock, 2,300 Norway Spruce.
 1,000 Scotch Pine.
 Capital City Gas Co., 100 Scotch Pine.
 H. W. Davis, 2,500 Norway Spruce.
 Plainfield, W. S. Martin, 1,000 Japanese Larch.
 250 Basswood.
 1,000 Scotch Pine.
 Roxbury, Vermont Marble Co., 10,000 Norway Spruce.
 Waitsfield, Dan Folsom, 1,500 Norway Spruce.
 Walter M. Gaylord, 1,000 Scotch Pine.
 Richardson Brothers, 5,000 Norway Spruce.
 1,000 Basswood.
 Waterbury, J. P. Talbert, 1,000 Scotch Pine.
 Worcester, Fred A. Hills, 1,000 Basswood.

WINDHAM COUNTY

Brattleboro, E. B. Barrows, 5,000 Scotch Pine.
 R. C. Clark, 5,000 Scotch Pine.
 Fred H. Davis, 3,000 Scotch Pine.
 E. L. Hildreth, 5,000 Scotch Pine.
 F. C. Holbrook, 1,000 Basswood.

APPENDIX C.

FIRES REPORTED FOR 1920.

te fire	Duration	Cause	Area-Acres	Damage	Expense	Warden
"11 10	2 hrs.	Children	1.0		\$ 1.34	Leon Steenburg
"11 17	2 "	Children	2.0		2.67	Leon Steenburg
"11 17	1 "	Smokers	2.0	\$25.00	14.00	R. A. O. Spindler
"11 17	1 "	Brush burning	40.0		0.00	F. W. Howland
"11 18	4 "	Brush burning	2.5	10.00	4.34	Jesse Ridley
"11 18	1 "	Smokers	2.0		10.25	J. B. Wooley
"11 19	12 "	Smokers	20.0		43.34	Jesse Ridley
"11 20	4 "	Railroads	5.0	10.00	4.00	W. P. Eames
"11 20	6 "	Sparks from mill	75.0	100.00	28.20	J. H. McCollough
"11 20	1 "	Railroads	7.0	10.00	5.00	F. R. Thomas
"11 30	7 "	Brush burning	2.0		0.00	S. W. Russell
y 7	3 "	Brush burning	10.0		22.50	C. F. Clifford
y 6	3/4 "	Railroads	0.1		0.00	Russell Watson
y 15	24 "	Railroads	15.0		0.00	S. W. Russell
y 16		Brush burning	2.0		0.00	J. C. Houston
y 16	5 days	Brush burning	50.0		52.50	F. B. Root
y 16	2 hrs.	Smokers	10.0		4.00	F. H. Pierce
y 16	4 "	Brush burning	6.0		0.00	C. A. Aldrich
y 17	8 "	Brush burning	100.0	30.00	33.30	John L. Baker
y 18		Burning building	3.5		40.00	Geo. H. Wood
y 19	2 hrs	Brush burning	7.0		0.00	J. P. Locke
y 19	12 "	Fisherman	70.0	80.00	39.00	F. H. Beane
y 19	7 "	Unknown	15.0	200.00	64.95	W. A. Davis
y 19	10 "	Carelessness	15.0		90.00	B. W. Boyd
y 20	4 "	Railroads	50.0		10.00	H. M. Ricker
y 20	4 "	Brush burning	2.0		8.00	E. T. Anderson
y 20	4 "	Brush burning	2.0			

FIRES REPORTED FOR 1920—(Continued.)

Fire	Duration	Cause	Area-Acres	Damage	Expense	Warden
y 20	3½ hrs.	Unknown	10.0	\$ 50.00	\$23.75	Charles M. Everts
y 27	1 "	Brush burning	0.5		9.60	B. H. Newton
y 28	4 "	Smokers	5.0		0.00	F. E. Harrington
y 28	48 "	Fishermen	800.0	6000.00	0.00	A. E. Briggs
y 30	48 "	Unknown	35.0		29.65	E. A. Martin
y 31	3 "	Carelessness	2.0		33.00	B. W. Boyd
y 31	3 "	Unknown	25.0	200.00	40.00	W. W. Adair
y 31	5 "	Unknown	25.0	200.00	100.00	W. W. Adair
y 31	9 days	Unknown	10.0	1000.00	63.00	D. L. Barber
e 1	48 hrs.	Unknown	200.0		0.00	L. W. Howse
e 2	20 "	Unknown	100.0	100.00	5.00	A. C. Presby
e 2	12 "	Brush burning	25.0		5.00	W. A. Kelly
e 2	122 "	Lumbering	1.25		20.85	Wm. J. George
e 2	2 "	Campers	5.0	5.00	15.00	O. A. Renfrew
e 3	3 hrs.	Unknown	2.0		0.00	B. P. Witham
e 4	8 "	Unknown	75.0	750.00	38.68	W. S. Heath
e 4	11 "	Brush burning	0.5	15.00	4.50	Philip Shonio
e 8	2 "	Smokers	0.5		0.00	J. P. Locke
e 10	1½ "	Fisherman	2.5		0.00	J. P. Locke
e 11	4 "	Smokers	0.25		0.00	C. N. Southard
e 13	4 "	Unknown	1.0	15.00	7.00	R. A. Ritchie
e 14	336 "	Camp fire	15.0	100.00	47.45	H. A. Davis
e 15	3 "	Smokers	0.12		0.00	J. P. Locke
e 15	3 "	Brush burning	0.5		0.00	C. E. Gray
e 22	1 "	Camp fire	1.5	20.00	0.00	J. E. Wilder
e 29	1 "	Railroads	0.13	45.00	10.00	R. W. Snyder
y 12	½ "	Brush burning	0.33	5.00	0.00	D. F. Gregory
y 15	24 "	Unknown	2.0		13.60	L. D. Morse
y 10	12 "	Berry pickers	50.0		7.00	S. B. Hawkes

FIRES REPORTED FOR 1920—(Concluded.)

ate fire	Duration	Cause	Area-Acres	Damage	Expense	Warden
g 27	3 hrs.	Burning bees' nest	Spot		\$ 7.50	F. H. Neff
t 21	"	Brush burning	Spot		12.00	J. W. Mobens
t 22	2 "	Hunters	3.0		0.00	R. W. Snyder
t 22	13 "	Incendiary	45.0	\$1,180.00	15.00	F. H. Beane
t 22	9 "	Brush burning	5.5	100.00	0.00	J. W. Swasey
t 22	4 "	Railroads	200.0		26.00	W. A. Newell
t 22	32 "	Railroads	25.0	150.00	147.00	G. H. Wood
t 24	5 "	Unknown	6.0		7.50	F. H. Beane
t 24	48 "	Unknown	15.0		17.40	N. W. Hathorn
t 25	8 "	Smokers	5.0	50.00	11.00	V. S. Thayer
t 26	5 "	Unknown	1.0		0.00	E. R. Cook
t 27	3½ "	Unknown	2.0		0.00	F. P. Dwinell
t 27	2 "	Smokers	0.25		28.00	E. E. Wright
dated	3.0	Smokers	3.0		0.00	C. A. Aldrich
dated	7 days	Brush burning	.5		0.00	Philip Shonio

APPENDIX D.

FIRES REPORTED FOR 1921.

Fire	Duration	Cause	Area-Acres	Damage	Expense	Warden
.14	1½ hrs.	Unknown	1.0	\$ 20.00	\$48.75	R. F. Jones
.21	"	Brush burning	0.5	0.00	6.00	R. A. O. Spindler
.23	36	Miscellaneous	4.0	0.00	19.25	D. L. Barber
.23	2	Brush burning	2.0	75.00	0.00	F. L. Thomas
.23	4	Brush burning	30.0	0.00	2.00	F. V. Wilbur
.24	"	Brush burning	1.0	0.00	3.00	R. W. Snyder
.28	4½	Brush burning	0.5	0.00	2.00	R. A. O. Spindler
.3	4	Unknown	3.0	0.00	2.67	Jas. P. Flynn
.3	4	Unknown	8.0	0.00	15.00	W. N. Parker
.3	8	Brush burning	14.0	0.00	4.50	S. D. Harwood
.4	4	Railroad	5.0	0.00	5.05	F. R. Thomas
.5	1	Children	1.0	0.00	8.50	G. H. Wood
.5	2½	Brush burning	3.0	0.00	0.00	M. E. Robbins
.5	1	Brush burning	spot	0.00	0.00	M. E. Robbins
.5	¼	Brush burning	spot	0.00	0.00	M. E. Robbins
.6	4	Unknown	18.0	0.00	36.00	C. S. Leonard
.6	2	Brush burning	5.0	0.00	0.00	F. V. Wilbur
.6	4	Railroad	3.0	0.00	21.00	G. H. Wood
.6	3	Smokers	5.0	25.00	4.29	W. H. Allen
.6	14	Unknown	14.0	83.00	14.20	L. B. Needham
.6	3	Smokers	3.0	10.00	33.00	L. F. Newell
.6	1	Brush burning	1.0	10.00	0.00	L. F. Newell
.6	1	Smokers	2.0	0.00	11.80	H. B. Laurence
.6	1	Unknown	20.0	0.00	0.00	E. K. Houghton
.6	15	Unknown	50.0	1,000.00	39.20	H. S. Wright
.7	6	Brush burning	10.0	0.00	0.00	G. W. Harrington
.7	3	Brush burning	4.0	10.00	10.50	F. M. Hutchins

FIRES REPORTED FOR 1921—(Continued.)

Fire	Duration	Cause	Area-Acres	Damage	Expense	Warden
7	1 hrs.	Railroad	1.0	\$ 5.00	\$ 5.00	R. W. Snyder
9	3 "	Brush burning	12.0	0.00	0.00	F. W. Wilbur
10	5 "	Smokers	5.0	0.00	0.00	E. A. Gray
11	7 "	Unknown	12.0	0.00	10.89	J. P. Flynn
11	5 "	Railroad	25.0	100.00	0.00	J. L. Peterson
12	4 "	Smokers	20.0	140.00	130.00	F. R. Thomas
12	7 "	Unknown	10.0	25.00	14.00	R. L. Sherman
12	"	Unknown	spot	0.00	2.00	J. P. Flynn
12	1 1/2	Railroads	5.0	0.00	16.50	J. B. Wooley
12	"	Unknown	40.0	200.00	20.00	E. W. Jaqueth
12	6 "	Railroads	50.0	0.00	8.53	J. L. Peterson
13	1 1/2	Smokers	2.0	0.00	0.00	D. L. Barber
13	3 "	Brush burning	4.0	0.00	0.00	Geo. W. Harrington
14	7 "	Unknown	15.0	0.00	3.96	J. P. Flynn
15	4 "	Brush burning	8.0	0.00	6.60	J. P. Flynn
25	"	Railroads	2.0	50.00	0.00	F. R. Thomas
25	4 "	Railroads	0.5	0.00	2.00	F. R. Thomas
26	1 "	Brush burning	3.0	0.00	3.75	Geo. H. Rumney
27	1 "	Brush burning	0.12	0.00	0.00	F. C. Chevrette
28	16 "	Brush burning	40.0	500.00	24.00	Joseph Lord
28	12 "	Brush burning	19.0	40.00	30.10	S. D. Harwood
29	3 "	Brush burning	1.12	20.00	17.50	E. M. Leffingwell
1	3 "	Brush burning	1.0	0.00	0.00	O. A. Renfrew
1	1 1/2	Unknown	0.25	2.00	9.00	O. Shores
2	1 "	Unknown	2.0	25.00	7.50	G. L. Butler
4	2 "	Unknown	3.0	35.00	50.00	G. L. Butler
4	2 "	Smokers	3.0	0.00	4.94	H. B. Lawrence
4	1 "	Railroads	2.0	20.00	9.00	R. W. Snyder

FIRES REPORTED FOR 1921—(Continued.)

ite fire	Duration	Cause	Area-Acres	Damage \$	Expense \$	Warden
ay 5	1 hrs.	Brush burning	12.0	0.00	0.00	M. A. Roy
ay 5	24 "	Smokers	1.25	0.00	6.00	James Conn
ay 5	3 "	Brush burning	2.0	0.00	0.00	W. A. Kelley
ay 6	10 "	Unknown	2.0	45.00	8.75	J. B. Wooley
ay 6		Unknown	2.0	0.00	4.00	E. R. Cook
ay 6		Railroads	3.0	0.00	0.00	R. F. Thomas
ay 6		Brush burning	spot	0.00	0.00	J. P. Locke
ay 6	23 "	Brush burning	spot	0.00	0.00	I. P. Locke
ay 6	6 "	Railroads	2.0	25.00	7.50	W. F. Burrington
ay 6	24 "	Railroads	4.0	70.00	0.00	O. A. Renfrew
ay 7	6 days	Unknown	40.0	20.00	44.70	H. S. Wright
ay 7	8 hrs.	Railroads	5.0	0.00	0.00	H. D. Webster
ay 7	72 "	Brush burning	2.0	40.00	9.00	H. D. Webster
ay 7	3 "	Railroads	25.0	300.00	16.50	F. E. Riley
ay 8	2 "	Unknown	2.5	50.00	0.00	O. A. Renfrew
ay 8	5 "	Lumbering	spot	25.00	3.00	F. R. Thomas
ay 8	24 "	Smokers	0.5	0.00	1.67	Jesse Ridley
ay 8		Railroads	6.0	0.00	8.00	W. F. Burrington
ay 8	2 "	Brush burning	spot	0.00	0.00	R. A. O. Spindler
ay 9	1 "	Unknown	0.5	20.00	0.00	Geo. F. Martin
ay 9	3 days	Brush burning	3.0	0.00	0.00	F. V. Wilbur
ay 9	48 hrs.	Brush burning	2.0	0.00	3.00	F. E. Riley
ay 10	5 "	Unknown	100.0	0.00	11.50	J. B. Wooley
ay 10	1 "	Unknown	15.0	10.00	9.00	E. E. Wright
ay 10	24 "	Smokers	0.5	0.00	5.00	James Conn
ay 10	1 "	Brush burning	2.0	0.00	0.00	W. A. Kelley
ay 10	4 "	Brush burning	1.0	0.00	0.00	F. C. Sheverette
ay 10		Lumbering	2.0	0.00	0.00	Raymond Moore
ay 11	4 "	Unknown	6.0	0.00	25.00	W. H. Parker

FIRES REPORTED FOR 1921—(Continued.)

ite fire	Duration	Cause	Area-Acres	Damage	Expense	Warden
ay 11	26 hrs.	Smokers	15.0	\$ 0.00	\$ 34.50	J. E. Wilder
ay 12	"	Rail oads	0.75	50.00	0.00	F. R. Thomas
ay 12	"	Incendiary	8.0	0.00	0.00	F. V. Wilbur
ay 12	12	Unknown	200.0	0.00	160.00	W. S. Tisdale
ay 12	3	Smokers	5.0	50.00	6.75	Geo. H. Rumney
ay 12	2	Lumbering	5.0	100.00	10.00	Raymond Moore
ay 12	3	Unknown	15.0	0.00	25.00	E. A. Gray
ay 13	8	Brush burning	15.0	10.00	1.50	H. E. Muzzev
ay 14	3/4	Brush burning	3.0	0.00	0.00	H. D. Webster
ay 14	3/4	Brush burning	3.0	0.00	0.00	H. D. Webster
ay 15	8	Brush burning	10.0	0.00	0.00	H. E. Muzzev
ay 16	1	Brush burning	0.25	0.00	0.00	D. L. Barber
ay 16	7 1/2	Railroads	8.0	0.00	3.00	W. F. Burrington
ay 17	8	Brush burning	100.0	130.00	33.39	J. L. Baker
ay 18	20	Incendiary	6.0	0.00	6.00	A. C. Wells
ay 18	2	Brush burning	7.0	0.00	0.00	J. C. Laundry
ay 18	6 1/4	Railroads	1.5	0.00	12.00	W. C. Baldwin
ay 19	"	Incendiary	1.5	0.00	0.00	A. S. Kingsley
ay 19	2	Brush burning	1.0	25.00	22.00	G. E. Nelson
ay 20	36	Smokers	0.25	125.00	6.00	T. R. Dunn
ay 20	"	Smokers	1.0	0.00	0.00	L. B. Needham
ay 20	"	Unknown	170.0	1,155.00	406.52	M. E. Robbins
ay 20	3 days	Hunters	100.0	300.00	0.00	F. E. Riley
ay 20	1 hrs.	Brush burning	3.0	0.00	0.00	J. C. Laundry
ay 21	48	Smokers	3.0	1,000.00	50.00	L. E. Smith
ay 22	"	Smokers	25.0	275.00	24.00	A. A. Ranson
ay 23	24	Smokers	10.0	100.00	55.00	E. A. Gray
ay 23	1	Smokers	2.0	0.00	0.00	J. C. Laundry
ay 24	5	Unknown	10.0	100.00	1.50	F. E. Riley

FIRES REPORTED FOR 1921—(Continued.)

fire	Duration	Cause	Area-Acres	Damage	Expense	Warden
24	1 hrs.	Brush burning	0.5	\$ 0.00	\$ 3.00	W. A. Newell
24	3 "	Smokers	0.75	25.00	30.00	Geo. F. Martin
27	"	Railroads	0.5	0.00	0.00	C. W. Howse
28	4 "	Unknown	2.0	0.00	10.50	F. R. Dunn
28	"	Brush burning	5.0	0.00	0.00	E. T. Anderson
30	24	Smokers	0.5	0.00	0.00	A. A. Ranson
	8 hrs.	Brush burning	1.0	0.00	0.00	Henry Potter
	"	Brush burning	0.12	0.00	0.00	J. B. Dolan
31	10	Lumbering	3.0	600.00	100.00	L. H. Spaulding
2	"	Unknown		0.00	0.00	T. J. Mallory
3	3	Smokers	1.5	10.00	4.50	A. A. Ranson
3	7	Unknown	7.0	0.00	0.00	C. A. Smith
3	120	Brush burning	6.0	0.00	10.50	W. F. Burrington
3	84	Brush burning	4.0	0.00	29.52	O. T. Hazelton
4	4	Unknown	4.0	800.00	0.00	John St. John
4	12	Brush burning	9.0	100.00	0.00	L. R. Miller
4	24	Unknown	2.0	0.00	35.10	B. E. Walker
5	1	Smokers	spot	0.00	10.00	A. E. Farr
6	1	Railroads	0.25	0.00	1.50	Wm. Ladue
6	1	Unknown	1.0	100.00	7.50	D. A. Boardman
7	12	Brush burning	1.5	0.00	0.00	J. C. Houston
7	5	Incendiary	7.0	225.00	75.00	A. M. Austin
8	"	Smokers	3.0	0.00	12.15	J. E. Conroy
8	14	Incendiary	8.0	0.00	35.00	A. M. Curtis
9	"	Unknown	5.0	0.00	0.00	Frank Warren
9	42	Incendiary	10.0	232.00	110.10	C. A. Aldrich
10	2	Unknown	8.0	220.00	0.00	F. E. Allen
10	3	Smokers	10.0	0.00	32.00	J. E. Conroy
10	1	Incendiary	30.0	100.00	68.00	Nels Torkelson

FIRES REPORTED FOR 1921—(Continued.)

Duration	Cause	Area-Acres	Damage	Expense	Warden
6 hrs.	Unknown	10.0	\$150.00	\$ 30.00	C. F. Clifford
3 "	Unknown	8.0	75.00	62.00	R. W. Snyder
15 "	Brush burning	1.5	0.00	0.00	J. C. Houston
1 "	Unknown	1.0	0.00	0.00	N. W. Hathorn
3 "	Unknown	spot	0.00	8.75	B. H. Newton
	Railroads	1.0	40.00	0.00	H. E. Muzzy
	Campers	spot	0.00	0.00	J. P. Locke
10 "	Campers	spot	0.00	0.00	J. P. Locke
1 "	Brush burning	0.5	0.00	0.00	J. C. Houston
2 "	Miscellaneous	spot	0.00	3.00	John St. John
	Hunters	1.0	25.00	3.00	F. E. Riley
1 1/2 "	Brush burning	spot	0.00	0.00	J. P. Locke
4 "	Railroads	0.33	0.00	0.00	L. W. Howse
4 "	Smokers	spot	18.00	1.00	J. L. DeWitt
4 "	Incendiary	40.0	200.00	119.70	R. W. Snyder
1 "	Unknown	1.0	2.00	3.00	Orange Shores
	Unknown	2.0	0.00	40.55	D. L. Barber
3 "	Unknown	spot	0.00	0.00	M. E. Robbins
24 "	Campers	0.13	40.00	22.17	A. E. Farr
1 "	Unknown	1.0	0.00	5.00	Geo. M. Wood
6 "	Unknown	spot	10.00	3.00	F. C. Shavrette
2 "	Lumbering	1.0	0.00	21.97	O. T. Hazelton
2 "	Smokers	1.0	280.00	75.00	L. H. Spaulding
1 "	Unknown	2.0	100.00	42.45	E. A. Gray
	Fishermen	spot	0.00	0.00	J. P. Locke
24 "	Brush burning	5.0	200.00	18.00	P. H. Brahana
4 "	Smokers	2.0	0.00	25.00	W. A. Newell
2 wks.	Unknown	1.0	50.00	28.00	F. R. Dunn
10 hrs.	Brush burning	4.0	0.00	0.00	E. T. Anderson

FIRES REPORTED FOR 1921—(Continued.)

ate fire	Duration	Cause	Area-Acres	Damage	Expense	Warden
ly 3	1 hrs.	Camp fire	0.12	\$ 0.00	\$ 3.00	C. A. Smith
ly 4	12 "	Unknown	5.0	0.00	30.00	W. S. Tisdale
ly 4	5 days	Camp fire	5.0	0.00	94.69	A. E. Farr
ly 4	1½ hrs.	Unknown	1.0	17.00	53.00	Orange Shores
ly 6	1½ "	Brush burning	spot	0.00	0.00	Geo. Conn
ly 6	2 "	Smokers	0.25	0.00	3.00	C. A. Smith
ly 6	½ "	Smokers	0.13	0.00	0.00	L. B. Needham
ly 5	3 "	Camp fire	0.5	18.00	15.00	A. D. Stinson
ly 7	3 "	Unknown	0.5	0.00	10.00	P. H. Brahana
ly 8	140 hrs.	Lightning	0.5	25.00	9.00	J. M. Pendrigh
ly 8	48 hrs.	Lightning	1.0	50.00	21.75	L. A. Egan
ly 9	3 "	Brush burning	2.0	0.00	4.00	Wm. F. Swanson
ly 10	6 "	Brush burning	2.0	0.00	0.00	L. R. Miller
ly 12	20 "	Fishermen	spot	0.00	3.00	E. J. Wheeler
ly 14	3 "	Unknown	1.0	48.00	55.00	H. W. Duff
ly 15	12 "	Lightning	spot	8.00	0.00	J. L. DeWitt
ly 20	40 "	Unknown	1.0	5.00	5.00	C. A. Gates
ly 22	40 "	Smokers	1.5	0.00	9.50	Wm. Gilmore
ly 24	40 "	Unknown	5.0	0.00	0.00	F. L. Warren
ly 24	19 days	Campers	5.0	160.00	274.60	W. A. Kelly
ly 26	2 hrs.	Unknown	0.25	0.00	4.00	J. C. Holmes
ly 30	24 "	Campers	spot	0.00	3.00	E. J. Wheeler
ug. 5	24 "	Unknown	1.0	45.00	8.00	J. P. Flynn
ug. 5	18 "	Unknown	20.0	75.00	0.00	F. O. Partee
ug. 5	1 "	Unknown	10.0	0.00	7.50	W. S. Tisdale
ug. 5	5 "	Smokers	10.0	35.00	0.00	Geo. W. Palmer
ug. 6	6 "	Smokers	spot	0.00	10.00	W. A. Kelly
ug. 7	2 "	Smokers	0.25	0.00	0.50	John Burley
ug. 8	½ "	Campers	spot	0.00	0.00	E. H. Chamberlin

FIRES REPORTED FOR 1921—(Continued.)

fire	Duration	Cause	Area-Acres	Damage \$	Expense \$	Warden
10	1 hrs.	Unknown	spot	0.00	0.00	Geo. W. Harrington
10	24 "	Brush burning	25.0	150.00	9.00	F. E. Riley
14	2 "	Unknown	2.0	0.00	0.00	F. E. Riley
14	5 days	Brush burning	3.0	62.00	1.50	C. A. Smith
15	1 hrs.	Unknown	2.0	0.00	0.00	T. R. Dunn
18	64 "	Smokers	1.0	0.00	40.00	L. E. Smith
25	1 "	Unknown	0.5	0.00	0.00	L. O. Hathaway
29	1 "	Unknown	10.0	0.00	235.00	H. J. Fales
11	1 "	Smokers	0.25	0.00	4.80	D. A. Giddings
	1 "	Brush burning	3.0	0.00	0.00	Henry Potter
	1 1/2 "	Hunters	spot	0.00	0.00	E. H. Chamberlin
		Fishermen	spot	0.00	0.00	E. J. Wheeler
1	2 "	Railroads	2.0	25.00	4.50	J. L. Baker
2	1 "	Smokers	0.5	0.00	6.00	D. A. Giddings
2		Unknown	10.0	100.00	7.50	Geo. H. Rumney
4	4 "	Campers	0.75	0.00	6.80	D. A. Giddings
5	3 "	Brush burning	1.5	0.00	0.00	J. B. Dolan
5	3 "	Unknown	25.0	100.00	10.00	H. E. Muzzey
5	1 1/2 "	Unknown	0.5	15.00	6.00	H. W. Duff
5	2 "	Unknown	1.5	50.00	35.00	Clarence Grant
6	2 "	Unknown	2.0	0.00	4.50	G. L. Butler
7	2 "	Campers	spot	0.00	2.31	D. A. Giddings
8	4 hrs.	Campers	3.0	0.00	23.35	D. A. Giddings
9	5 "	Unknown	1.0	0.00	3.00	G. L. Butler
9	1 wk.	Unknown	5.0	2.00	46.60	Ed. Trudo
9	1 1/2 hrs.	Unknown	15.0	1,500.00	55.00	T. J. Mallory
9		Unknown	3.0	120.00	57.77	A. N. Ainsworth
10		Brush burning	6.0	0.00	24.00	H. W. Duff
10		Unknown	2.0	4.00	7.50	Orange Shores

FIRES REPORTED FOR 1921—(Continued.)

e fire	Duration	Cause	Area-Acres	Damage	Expense	Warden
15	1 hrs.	Brush burning	spots	\$ 0.00	\$ 0.00	T. R. Dunn
15	3 "	Brush burning	1.0	0.00	0.00	C. S. Goodnow
19	3 "	Campers	1.25	0.00	0.00	D. E. Spicer
20	24 "	Hunters	0.12	0.00	0.00	A. N. Ainsworth
25	2 "	Hunters	0.25	0.00	0.00	A. N. Ainsworth
27	2 "	Unknown	0.5	0.00	0.00	O. A. Renfrew
29	6 "	Hunters	spot	0.00	10.50	J. B. Wooley
1	4 "	Smokers	0.5	2.00	0.00	R. W. Snyder
2	2 "	Hunters	2.0	0.00	10.25	J. B. Wooley
2	3 "	Unknown	4.0	50.00	0.00	A. I. Duntun
6	24 "	Unknown	2.0	150.00	35.00	E. R. Bridge
7	15 "	Smokers	1.0	15.00	17.70	Wm. F. Swanson
9	3 "	Smokers	2.0	50.00	6.80	J. E. Conroy
10	1 "	Brush burning	6.0	0.00	0.00	J. C. Houston
13	6 days	Campers	4.0	10.00	12.00	F. M. Hutchins
16	30 hrs.	Smoking out hedge hog	4.0	50.00	8.75	Geo. W. Merritt
16	30 "	Smoking out hedge hog	5.0	75.00	22.50	Geo. W. Merritt
18	14 "	Campers	spot	0.00	3.00	F. A. Curtis
22	3 "	Unknown	20.0	0.00	62.80	G. W. Harrington
23	3 "	Hunters	6.0	0.00	7.50	J. C. Laundry
27	6 "	Smokers	10.0	150.00	9.50	V. S. Thayer
27	1 "	Railroads	1.0	5.00	0.00	R. W. Snyder
28	43 hrs.	Unknown	5.0	0.00	6.00	Wm. P. Eames
29	5 "	Unknown	2.5	0.00	15.99	Jesse Ridley
30	3 1/2 "	Smokers	2.0	0.00	30.00	Wm. Ladue
30	30 "	Hunters	225.0	120.00	50.00	John Kenworthy
30	5 "	Unknown	3.0	70.00	22.00	David Boardman
30	4 "	Brush burning	1.0	0.00	0.00	Raymond Moore
31	6 "	Hunters	60.0	0.00	31.00	Harry N. Langdon

FIRES REPORTED FOR 1921—(Concluded.)

State fire	Duration	Cause	Area-Acres	Damage	Expense	Warden
t. 31	8 hrs.	Brush burning	15.0	\$ 0.00	17.75	G. F. Clifford
t.		Brush burning	1.0	0.00	0.00	J. B. Dolan
v. 2	"	Smokers	spot	0.00	0.00	T. J. Mallory
dated	2	Smoking out squirrel	spot	0.00	0.00	F. L. Wilmarth
dated		Railroads	0.25	0.00	0.00	A. C. Presby
dated	"	Brush burning	2.0	75.00	150.00	E. E. Wright
dated		Lumbering	0.25	60.00	0.00	
dated		Unknown	10.0	0.00	0.00	A. C. Presby
dated	5	Smokers	9.0	200.00	3.00	A. E. Allyn
dated	24	Hay fire	spot	2.00	3.00	R. D. Clayton
dated	"	Brush burning	4.0	0.00	8.00	M. R. Alexander
dated	8	Unknown	spot	0.0	0.00	F. C. Sheverette
dated	"	Unknown	3.0	0.00	0.00	Wm. H. Allen
dated	3	Railroads	0.5	0.00	0.00	F. P. Twiss
dated	3	Unknown	15.0	25.00	10.50	H. R. Benson
small fires	5	railroads—9 campers	spots	0.00	0.00	J. Kenworthy
small fires		Campers	spots	0.00	0.00	J. C. Holmes
small fires		Railroads	spots	0.00	0.00	Nelson Baldwin

Dairy Statistics 1920

DUCTS HANDLED BY FACTORIES AND SHIPPING STATIONS

Value \$	Milk Conden- sed (Lbs.)	Aver- age Price Per Cwt.	Value \$	Milk made into Cheese Lbs.	Aver- age Price Per Cwt.	Value \$	Sweet Cream Fat Sold (Lbs.)	Aver- age Price Per Lb.	Value \$
7,489.68	3,326,259	\$3.815	\$126,892.40	1,470,658	\$3.622	\$53,269.71	487,003.92	\$.734	\$357,699.29
9,600.91	3,375,990	3.521	118,870.73	1,571,262	3.202	50,308.48	469,315.32	.739	346,770.14
8,098.40	4,485,859	3.336	149,656.79	1,871,538	3.202	59,938.90	719,425.59	.739	531,437.49
5,924.37	5,493,900	2.644	145,300.99	3,887,997	2.813	109,397.51	857,445.50	.752	644,411.10
1,002.93	5,658,177	2.369	134,024.36	5,020,699	2.850	143,094.40	1,007,199.20	.681	685,981.95
8,628.40	6,130,429	2.794	171,342.73	7,961,453	2.671	212,715.63	1,294,341.08	.646	836,465.09
2,238.64	4,982,874	2.961	147,559.89	5,378,624	2.507	134,849.52	1,028,098.45	.665	683,768.90
5,044.15	4,275,786	3.385	144,762.60	2,437,948	2.636	64,274.81	758,549.42	.663	502,700.87
4,070.31	3,981,281	3.658	145,626.35	1,918,814	3.907	55,797.78	702,163.86	.682	479,130.44
4,962.29	1,550,524	3.570	55,365.60	2,882,824	3.271	94,309.87	687,088.93	.681	467,919.79
7,368.55	671,406	3.286	22,062.98	1,798,945	3.239	58,279.91	506,334.99	.673	340,581.80
3,496.81	238,522	3.211	7,557.91	1,593,847	3.016	48,070.85	487,017.64	.616	300,115.62
2,925.44	44,171,007	\$3.100	\$1,369,023.33	37,794,609	\$2.868	\$1,064,306.87	9,003,983.90	\$.686	\$6,176,982.48

1920—Continued.

into bs.)	Average Price Per Lb.	Value \$	Butter Manufac- tured (lbs.)	Ave. Over- run (%)	Skim milk Mfg. and Shipped (Lbs.)	Average Price Per Cwt.	Value \$	Total Amount 3.7% Milk in all Prod- ucts (lbs.)
4.15	\$.746	\$ 447,236.31	737,528	22.90	3,371,416	\$ 1.11	\$ 38,611.95	51,585,252
0.30	.744	436,836.53	705,063	22.16	5,027,079	.761	38,286.33	51,370,232
2.37	.744	607,829.61	975,954	19.46	7,224,635	.558	40,352.57	68,480,716
1.53	.757	761,828.29	1,236,626	22.90	9,148,245	.561	51,364.53	78,687,598
7.92	.673	899,803.81	1,640,421	22.60	11,337,212	.542	61,449.98	96,097,582
4.41	.641	1,041,444.52	1,995,205	22.81	12,175,491	.727	88,565.97	116,347,562
4.42	.648	855,622.47	1,595,513	20.91	8,769,081	.775	68,040.37	96,471,316
5.44	.649	618,015.07	1,159,996	21.91	5,630,146	.990	55,745.36	73,643,284
3.59	.679	534,444.66	953,038	21.08	6,040,079	1.01	61,276.00	66,211,172
3.35	.653	545,393.98	1,019,839	22.03	5,205,369	.912	47,472.46	64,981,389
7.41	.656	438,230.17	818,672	22.59	4,132,711	.885	36,604.21	52,596,196
3.21	.603	380,669.04	776,425	23.00	4,709,342	.958	45,154.45	49,517,736
.10	\$.678	\$ 7,567,354.46	13,614,300	22.05	82,770,806	\$.704	\$ 632,924.18	865,990,035

SUMMARY

VERMONT DAIRY STATISTICS

1920

Items	Total Pounds	Average Price \$	Total Value \$	Total Pounds 3.7% Milk	Percentage of all Products Sold
	239,195,555	\$3.553	\$8,490,925.44	239,195,555	27.62
k)	44,171,007	3.100	1,369,023.33	44,171,007	5.11
	37,794,609	2.868	1,084,306.87	37,794,609	4.36
	9,003,983.9	.686	6,176,982.48	243,350,911	28.10
	11,154,685	.678	7,567,354.46	301,477,953	34.81
Manufactured and Shipped	82,770,806	.764	632,924.18		
L			\$25,321,516.76	865,990,035	100.00

Value of all dairy products sold from factories and shipping stations amounts to \$25,321,516.76. The total number of milk used in all products amounts to 865,990,035 lbs. returning an average price of \$2.9240 per cwt. to the

Milk produced in 1920 based on an average annual production of 3,560 pounds of milk per cow amounts to 1,032,834,- a total value of milk used in Vermont on farms as human food, for feeding stock, sold locally and shipped direct to about \$4,878, 558.00. The grand total of Vermont's dairy industry for the year 1920 amounts to approximately

Dairy Statistics 1921

Y PRODUCTS HANDLED BY FACTORIES AND SHIPPING STATIONS

er- re ice er rt.	Value \$	Milk Conden- sed (Lbs.)	Aver- age Price Per Cwt.	Value \$	Milk made into Cheese Lbs.	Aver- age Price Per Cwt.	Value \$	Sweet Cream Sold (Lbs.)	Aver- age Price Per Lb.	Value \$
241	\$ 594,464.36	284,024	\$3.052	8,668.76	1,759,412	\$2.638	46,421.48	557,831.04	.582	\$ 324,853.74
794	452,076.44	1,229,257	2.463	30,272.43	1,427,901	2.497	35,650.88	610,243.11	.556	344,254.54
511	465,057.04	2,993,761	2.321	69,489.60	2,212,526	2.331	51,571.64	822,718.30	.540	444,644.31
365	415,443.03	5,087,897	2.240	113,987.24	3,145,417	2.002	62,976.96	1,037,361.07	.515	534,213.71
996	432,626.92	7,254,858	1.815	131,668.09	5,190,558	1.623	84,243.71	1,385,131.45	.395	547,006.71
974	434,915.70	5,289,294	1.712	90,564.52	5,150,435	1.599	82,335.71	1,417,650.41	.397	562,174.53
280	540,121.67	2,700,174	1.979	53,428.04	2,852,891	1.920	54,787.49	1,138,259.16	.477	543,340.80
726	594,831.25	2,642,096	2.274	60,069.89	2,629,766	2.033	53,456.79	1,075,826.97	.495	532,947.02
344	603,440.59	2,693,325	2.429	65,426.92	1,749,374	2.016	35,270.36	841,860.21	.527	444,038.61
314	634,218.24	2,977,619	2.343	69,760.36	1,770,071	2.273	40,228.81	707,846.79	.544	385,338.14
395	586,169.51	1,949,451	2.440	47,562.86	1,027,493	2.254	23,162.50	613,260.68	.529	324,463.45
773	594,281.11	2,310,965	2.327	53,776.03	810,168	2.071	16,778.60	690,362.77	.527	364,065.20
310	\$ 6,337,645.86	37,412,721	\$2.124	\$ 794,674.74	29,726,012	\$1.974	\$ 580,884.93	10,907,351.96	.491	\$ 5,351,340.76

1921—Continued.

Made into er (Lbs.)	Average Price Per Lb.	Value \$	Butter Manufac- tured (lbs.)	Ave. Over- run (%)	Skim milk Mfg. and Shipped (Lbs.)	Average Price Per Cwt.	Value \$	Total Amount 3.7% Milk in all Prod- ucts (lbs.)
736,341.03	.586	\$ 431,130.24	904,329.9	22.80	5,436,792	.581	\$ 31,614.69	55,055,684
703,677.20	.533	375,005.80	859,671	22.16	5,780,490	.509	29,402.05	54,594,662
972,823.70	.520	506,238.75	1,185,077	21.82	8,123,619	.350	28,467.44	72,257,267
209,896.62	.477	575,154.60	1,485,066	22.74	10,223,209	.419	42,884.98	86,533,910
797,491.50	.340	611,332.98	2,162,600	20.31	14,409,276	.412	59,306.24	120,133,275
825,602.20	.363	590,578.36	1,972,474.5	21.34	9,569,770	.437	41,791.83	114,717,104
160,321.40	.444	514,722.52	1,411,890	21.68	7,666,219	.450	34,510.78	91,369,870
107,115.20	.465	515,020.08	1,351,554.5	22.07	6,680,263	.644	43,040.08	86,094,616
961,843.20	.482	463,817.86	1,167,244	21.35	4,639,386	.654	30,360.58	74,409,031
956,863.20	.509	487,144.75	1,165,582.5	21.81	4,997,690	.642	32,083.01	70,782,104
723,922.70	.502	363,284.45	889,378.5	22.85	4,872,484	.679	33,094.92	58,687,908
771,478.27	.480	370,177.98	946,898.5	22.74	6,043,482	.641	38,754.35	64,060,309
727,382.22	.456	\$5,803,608.37	15,501,766.4	21.80	88,442,680	.504	\$445,310.95	948,695,740

SUMMARY
VERMONT DAIRY STATISTICS

1921

Products	Total Pounds	Average Price \$	Total Value \$	Total Pounds 3.7% Milk	Percentage of all Products Sold
Milk)	242,780,417	\$2.610	\$6,337,645.86	242,780,417	25.59
Butter	37,412,721	2.124	749,674.74	37,412,721	3.95
Sticks	29,726,012	1.974	586,884.93	29,726,012	3.13
Condensed	10,907,351.96	.491	5,351,340.76	294,793,293	31.07
Manufactured and Shipped	12,727,382.22	.456	5,803,608.37	343,983,297	36.26
	88,442,680	.504	445,310.95		
AL			\$19,274,415.61	948,695,740	100.00

Value of all dairy products sold from factories and shipping stations amounts to \$19,274,465.61. The total number of milk used in all products handled amounts to 948,695,740 pounds, returning an average price of \$2.0317 per cwt.

Milk produced in 1921 based on an average annual production of 3,880 pounds of milk per cow amounts to 1,138,000,000 pounds. The total value of milk used in Vermont on farms as human food, for feeding stock, sold locally and shipped amounts to about \$3,855,116.00. The grand total of Vermont's dairy industry for the year amounts to approximately \$32.00.

1921 ABSTRACT OF RETURNS OF LIVE STOCK AND SILOS. ADDISON COUNTY.

Data furnished by Secretary of State.

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.	Total No. of Mules.
.....	70	530	688	1538	972	52	31	280	
.....	32	308	774	1122	578*	9	2	234	
.....	61	384	99	941	792	65	17	269	
.....	71	371	743	895	844	103	21	125	
.....	100	875	200	2150	1300	65	25	200	
.....	9	56	0	169	100	0	0	22	
.....	20	136	161	324	245	0	1	71	
.....	4	113	81	148	70	3	2	47	
.....	29	139	94	543	242	4	9	45	
.....	46	378	40	1261	564	21	8	255	
y.....	66	669	273	1459	627	30	16	210	
.....	49	363	177	1636	591	2	12	211	
n.....	110	475	480	1506	799	102	75	211	
.....	62	364	1282	1780	914	35	31	218	
.....	38	169	339	792	352	107	13	72	
.....	5	131	70	276	177	0	2	25	
.....	28	225	280	818	243	32	10	106	
.....	58	556	1171	1563	768	86	31	366	
.....	47	364	37	1452	647	6	26	219	

ltes.....	6	133	0	298	81	73	19	84
ton.....	36	147	135	759	257	1	16	11
idge.....	36	248	176	763	338	65	19	116
g.....	30	182	452	457	395	36	12	57
.....	1013	7316	7752	22650	11896	897	398	3454

BENNINGTON COUNTY.

in.....	* 15	* 249	* 438	* 453	* 329	* 0	* 0	* 141
ton.....	55	614	926	1020	534	2	1	278
bury.....	17	281	97	804	341	0	13	73
ve.....	0	21	0	8	0	0	0	1
ster.....	* 1	* 71	* 39	* 129	* 92	* 4	* 1	* 40
.....	14	356	223	1047	358	0	7	189
.....	3	148	37	125	108	16	4	46
.....	74	347	861	1073	364	18	7	149
pro.....	1	178	0	226	157	6	5	45
.....	65	296	378	1712	423	33	16	122
le.....	7	149	530	263	109	1	1	41
fg.....	0	37	10	38	33	27	4	24
ury.....	13	385	1360	596	363	21	5	165
d.....	* 16	* 146	* 8	* 314	* 177	* 13	* 0	* 47
and.....	6	81	216	178	128	6	7	27
.....	9	169	16	220	144	5	3	85
rd.....	0	54	0	31	16	0	0	3
.....	206	3582	5188	8227	3679	151	74	1476
.....								7

from the last previous returns.

CALEDONIA COUNTY.

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.	Total No. of Mules.
.....	62	519	115	1743	734	172	40	381	
.....	27	384	120	1022	494	37	21	287	
.....	41	723	321	2284	1232	228	71	503	
.....	34	224	5	641	533	37	17	148	
k.....	54	575	172	1821	721	37	10	408	
.....	15	194	134	799	328	40	23	73	
.....		547	427	1652	579	82	37	418	
.....	23	188	69	246	203	20	0	90	
l.....	57	278	27	1219	664	21	43	288	
.....	68	410	190	1689	1142	104	44	291	
sbury.....	33	667	219	1859	792	234	28	256	
.....	21	317	104	862	477	25	18	119	
i.....	12	127	72	341	122	9	4	56	
.....	32	309	94	863	379	19	2	98	
.....	3	331	190	1103	403	38	5	205	
rd.....	37	363	212	1225	606	0	21	190	
k.....	7	255	87	534	286	56	7	90	
.....	526	6411	2558	19908	9695	1159	391	3881	

CHITTENDEN COUNTY.

.....	15	145	29	476	153	17	5	53
.....	99	586	163	1970	886	77	32	* 101
.....	85	520	44	1620	575	8	9	105
.....	69	487	57	2287	931	116	31	225
.....	108	460	0	2292	702	14	7	447
.....	39	265	0	1357	357	15	0	121
.....	86	415	59	2008	524	45	21	166
.....	* 0	* 636	* 252	* 5039	* 390	* 70	* 0	114
.....	63	371	11	1836	556	103	17	* 1345
.....	56	505	257	1052	761	58	9	195
.....	40	303	33	1138	649	61	25	87
.....	5	42	0	213	82	2	1	452
.....	36	410	43	2042	737	45	20	12
.....	60	381	59	2148	746	125	43	352
.....	57	474	95	1915	669	41	20	182
.....	818	6490	1166	27787	12330	727	240	58
.....	818	6490	1166	27787	12330	727	240	4015

.....
Taken from the last previous returns.

ESSEX COUNTY.

field.....	8	143	77	294	134	14	3	56
on.....	* 2	* 186	73	652	* 316	0	0	88
wick.....	2	51	* 90	* 84	* 119	0	0	* 19
.....	2	336	44	744	289	2	3	64
.....	19	354	107	1170	476	0	35	140
d.....	0	50	13	91	50	8	3	9
aven.....	3	52	30	91	59	2	2	13
y.....	13	173	33	384	126	4	7	46
all.....	8	76	35	203	95	0	0	35
.....	49	344	240	1102	633	76	26	97
.....	49	344	240	1102	633	76	26	97

ESSEX COUNTY—(Concluded.)

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.	Total No. of Mules.
ne.....	3	89	101	205	130	27	6	26	
.....	* 2	* 117	* 28	* 259	* 226	*	* 2	* 28	
.....	* 2	* 69	* 2	* 108	* 73	0	0	* 23	
.....	111	2040	873	5387	2726	.133	87	647	
aken from the last previous returns.									

FRANKLIN COUNTY.

ield.....	32	430	91	1946	726	66	14	173	
re.....	52	483	71	3206	761	96	7	229	
g.....	* 60	* 653	* 79	* 3347	* 1003	* 265	* 46	* 472	
.....	53	462	17	2632	941			259	
l.....	72	481	148	3825	1053	22	16	182	
.....	19	268	26	1251	426	30	21	243	
.....	26	515	232	2676	742	91	37	449	
.....	71	487	91	2283	791	76	21	102	
.....	70	557	147	2153	645	5	20	270	
.....	53	185	61	1710	398	12	21	231	
.....	10	430	63	1811	410	11	4	193	
.....	54	535	8	2917	727	22	23	201	

City.....	1	235	0	40	*	0	*	0	*	0	27
Town.....	85	589	178	1869	725	247	34	128			
.....	*	81	* 591	* 60	* 1315	* 499	* 120	* 37	* 272		
.....	739	6911	1272	32861	9847	1063	301	3431			
n from the last previous returns.											

GRAND ISLE COUNTY.

.....	20	556	116	1076	545	7	18	136			
.....	55	375	308	928	305	21	28	174			
ite.....	4	168	55	420	212	29	5	23			
.....	8	250	316	675	136	53	11	93			
.....	59	288	316	795	458	64	13	165			
.....	146	1637	1111	3894	1656	174	75	591			

LAMOILLE COUNTY.

.....	8	101	10	310	100	5	0	29			
.....	90	630	126	3090	972	66	54	654			
.....	6	289	82	827	303	0	4	103			
.....	29	201	76	861	368	0	3	125			
.....	41	495	63	1915	635	19	30	188			4
.....	64	378	69	1283	584	55	18	178			
.....	73	719	266	2852	744	138	27	327			
.....	102	628	346	2437	923	204	37	427			
.....	13	167	81	375	209	6	0	60			
.....	41	375	65	1503	527	66	32	254			
.....	467	3983	1184	15453	5345	559	205	2345			4

n from the last previous returns.

ORANGE COUNTY.

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.	Total No. of Mules.
.....	77	418	171	977	566	90	8	183	
.....	64	329	178	951	444	11	29	113	
.....	122	458	153	1519	858	49	21	415	
.....	57	301	457	810	801	31	21	289	
.....	39	417	136	1073	732	46	18	254	
.....	24	164	76	399	253	25	4	118	
.....	96	557	742	2078	1157	100	23	291	
.....	25	235	120	456	433	113	18	122	
.....	* 235	* 819	* 406	* 2743	* 1533	* 204	*	* 641	
.....	37	238	186	643	537	62	23	161	
.....	46	395	295	1065	689	55	13	185	
.....	33	316	132	682	559	166	36	138	
.....	135	429	289	1279	1043	119	43	311	
.....	21	163	147	419	311	0	0	104	
.....	30	241	64	540	392	33	21	164	
.....	17	160	76	397	243	9	5	89	
.....	65	461	108	1264	978	54	15	253	
.....	1123	6101	3736	17295	11529	1167	317	3811	

..... from the last previous returns.

ORLEANS COUNTY.

.....	57	410	112	1695	621	66	32	230
ton.....	28	705	185	2505	569	90	30	241
.....	13	385	229	1420	576	14	0	172
.....	26	420	271	1459	808	57	23	343
.....	*23	*327	*389	*1561	*525	* 2	* 2	*133
.....	64	501	132	1944	727	189	29	350
.....	36	756	159	2829	1193	222	32	309
.....	36	408	247	1820	578	121	53	303
.....	22	424	184	1559	806	146	30	347
.....	4	380	245	1331	476	7	5	182
.....	37	427	259	2231	617	96	23	172
.....	4	166	11	730	277	0	4	72
.....	11	417	121	1359	795	7	5	198
.....	6	212	133	997	398	10	4	63
.....	41	509	202	2779	658	21	12	106
.....	26	418	34	1924	650	19	10	252
.....	26	155	30	825	370	50	10	100
.....	3	127	92	454	172	38	8	51
.....	461	7147	3035	29422	10816	1155	312	3621

n from the last previous returns.

RUTLAND COUNTY.

.....	53	342	1011	1209	733	11	21	149
.....	57	395	158	1158	732	42	30	189
.....	* 33	* 289	* 37	* 473	* 277	* 2	* 22	* 138
.....	22	194	108	396	290		2	78
.....	50	352	410	1406	788	112	22	41
.....	50	329	83	1424	793	16	7	138
.....	21	198	47	474	130	30	10	45
on.....	37	78	598	606	196	6	3	160

RUTLAND COUNTY—(Concluded.)

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milk Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock	Total No. of Purebred Bulls.	Total No. of Hogs.	Total No. of Mules.
.....	14	133	65	389	421	95	9	54	
" "	20	129	11	301	162	12	2	53	
" Springs	* 19	* 223	* 131	* 754	* 385	* 64	* 16	* 92	
" "	* 12	* 336	* 47	* 1243	* 327	* 12	* 35	* 218	
" "	0	25	0	62	21	0	0	0	
" "	90	297	105	1620	575	24	52	70	
" "	15	127	71	298	182	9	4	65	
" "	54	310	131	1414	561	110	23	153	
" "	5	61	0	224	111	3	3	18	
" ty.	10	363	54	397	76	47	6	26	5
" own.	50	312	118	1074	377	37	27	51	
" "	19	126	134	292	221	6	2	37	
" "	51	296	170	1371	466	96	21	170	
" "	35	206	363	745	368	12	8	116	
" "	18	198	47	888	396	128	19	75	
" l.	47	333	289	1209	718	37	14	188	
" "	23	176	63	766	183	71	24	43	
" n.	31	225	646	815	433	16	8	97	
" nd.	6	191	70	800	149	16	8	84	
" "	85	450	194	2084	1000	0	76	132	
..... from the last previous returns.	927	6694	5261	23892	11061	1014	474	2885	5

WASHINGTON COUNTY.

.....	3	160	0	177	40	6	2	18
.....	* 60	* 315	* 20	* 1120	* 330	* 210	* 29	* 260
.....	47	393	96	1139	696	13	24	225
.....	40	379	74	1799	932	192	76	234
.....	83	405	71	1428	739	156	44	306
.....	36	220	22	672	332	*	6	406
.....	99	430	144	1657	759	50	24	495
.....	18	78	0	831	84	10	3	86
.....	54	430	739	1324	448	125	33	310
.....	56	346	27	1203	538	62	21	228
.....	6	417	27	715	232	63	8	172
.....	53	461	56	1080	525	49	20	190
.....	75	392	180	978	624	96	34	300
.....	28	249	63	831	358	16	6	119
.....	21	238	106	470	223	13	7	88
.....	61	320	108	1152	867	166	32	171
.....	* 27	* 252	* 62	* 682	* 648	* 11	* 20	* 262
.....	50	486	106	1772	876	264	5	225
.....	30	242	37	607	284	18	10	120
.....	20	198	47	482	275	38	4	154
.....	867	6411	1985	19519	9800	1561	408	4329

from the last previous returns.

WINDHAM COUNTY.

.....	14	63	7	170	180	11	4	13
.....	52	385	149	745	565	297	25	260
.....	16	72	70	179	211	11	7	52
.....	12	171	199	294	255	*	2	64
.....	37	232	86	568	18	28	10	157
.....	19	161	96	189	222	0	6	76
.....	50	277	62	704	558	42	24	74
.....	9	180	230	349	313	* 14	3	79

WINDHAM COUNTY—(Concluded.)

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.	Total No. of Mules.
ry.....	13	235	117	328	241	4	4	91	
.....	35	346	236	701	449	47	17	159	
.....	14	129	170	194	326	49	4	57	
.....	30	184	89	416	329	51	12	110	
.....	* 44	* 177	* 238	* 542	* 404	* 150	*	55	
m.....	23	410	253	854	780	326	55	173	4
.....	* 0	47	* 0	4	8	* 0	*	28	
.....	* 0	* 59	* 6	* 36	87	* 0	* 1	11	
.....	* 20	* 263	* 141	* 504	578	* 0	*	109	
.....	56	191	7	513	290	178	20	83	
.....	13	135	120	253	285	4	3	56	
er.....	72	633	643	1104	1224	107	46	198	
m.....	* 29	* 281	* 401	* 681	* 613	* 103	*	* 156	
n.....	34	386	523	874	815	102	20	153	
.....	11	124	57	244	158	14	10	65	
.....	603	5141	3900	10444	8839	1542	302	2289	4

n from the last previous returns.

WINDSOR COUNTY.

.....	28	134	32	384	151	11	5	55
.....	5	40	57	96	74	13	4	15
.....	59	284	235	730	432	80	19	222
.....	60	351	193	994	694	37	0	225
.....	34	216	274	504	493	3	3	153
.....	24	243	227	463	363	43	6	106
.....	17	296	273	508	666	195	6	101
.....	45	612	365	1496	891	331	54	428
.....	*	552	* 936	*1398	* 943			359
.....	28	330	163	636	268	175	10	45
.....	53	464	246	1009	845	120	30	202
.....	*	121	* 61	* 286	* 233	*	2	* 46
.....	56	239	403	824	570	327	42	142
.....	*	166	* 241	*243	*187			82
.....	49	412	568	796	476	34	20	189
.....	99	506	161	1206	869	143	31	339
.....	47	230	138	558	436	34	3	147
.....	92	681	170	1489	922	75	19	224
.....	* 42	* 246	* 209	* 470	* 330	*	*	* 198
.....	*	348	* 328	*1088	* 728	4	4	* 189
f.....	13	107	126	571	316	0	0	114
.....	42	241	123	701	514	210	17	18
r.....	35	175	92	492	180	101	19	63
.....	48	699	763	1280	776	138	24	332
.....	879	7693	6384	18191	12346	2076	318	3994
.....								13

from the last previous returns.

SUMMARY BY COUNTIES, 1921.

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.	Total No. of Mules.
.....	1013	7316	7752	22650	11896	897	398	3454	7
.....	296	3582	5188	8227	3679	151	74	1476	
.....	526	6411	2558	19908	9695	1159	391	3881	
.....	818	6490	1166	27787	12330	727	240	4015	
.....	111	2040	873	5387	2726	133	87	647	
.....	739	6911	1272	32961	9847	1063	301	3431	
.....	146	1637	1111	3894	1656	174	75	591	
.....	467	3983	1184	15453	5345	559	205	2345	4
.....	1123	6101	3736	17295	11529	1167	317	3811	
.....	461	7147	3035	29422	10816	1155	312	3621	6
.....	927	6694	5261	27802	11061	1014	474	2685	5
.....	867	6411	1985	19519	9800	1561	408	4329	
.....	603	5141	3900	10444	8839	1542	302	2269	4
.....	879	7693	6384	18191	12346	2076	318	3994	13
.....	8976	77557	45405	255030	121565	13378	3902	40549	39

1922 ABSTRACT OF RETURNS OF LIVE STOCK AND SILOS.

ADDISON COUNTY:

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.	Total No. of Mules.
.....	61	509	480	1729	931	86	43	229	
.....	45	391	770	1588	683	0	2	341	
.....	60	379	80	980	726	32	14	229	
.....	66	388	648	914	808	88	18	155	
.....	30	295	35	942	444	11	20	78	
.....	11	79	1	166	131	0	0	34	
.....	20	137	117	347	243	0	0	47	
.....	8	88	127	140	50	0	1	37	
.....	37	160	27	526	208	10	4	49	
.....	* 46	* 378	* 40	* 1261	* 564	* 21	* 8	* 255	
.....	68	559	180	1502	576	131	22	145	
.....	48	345	72	1491	595	* 2	17	206	
.....	109	495	477	1411	936	257	71	179	
.....	65	346	924	1802	744	16	34	236	
.....	40	252	181	876	336	104	12	59	
.....	* 5	129	47	280	146	3	3	41	
.....	36	210	316	872	246	16	12	65	
.....	53	530	889	1583	800	15	30	346	
.....	* 47	* 364	* 37	* 1452	* 647	* 6	* 26	* 219	

te.....	65	282	332	1764	487	16	10	84
rg.....	11	161	550	310	131	0	0	27
ury.....	0	34	13	46	32	27	4	2
rd.....	21	471	1310	996	601	0	2	138
land.....	11	73	8	144	104	0	0	2
l.....	5	98	216	206	105	13	3	23
rd.....	12	114	33	263	154	9	2	45
	* 0	54	* 0	30	20	* 0	* 0	* 3
.....	207	3223	4451	8308	3930	175	83	957
aken from the last previous returns.								
CALEDONIA COUNTY.								
.....	71	525	115	1645	1159	217	81	310
.....	19	374	107	965	463	69	20	186
e.....	49	702	182	2055	1284	324	54	377
.....	34	220	0	650	515	35	15	160
ck.....	56	565	113	1839	727	18	12	249
.....	23	187	129	742	330	65	31	65
.....	* 547	* 427	* 1652	* 579	* 82	* 37	* 418	* 95
.....	12	173	58	352	228	19	10	56
n.....	59	313	27	1194	612	14	10	268
.....	79	396	168	1713	1047	153	46	268
l.....	18	284	117	988	420	15	14	80
nsbury.....	44	567	167	1464	676	217	36	189
rd.....	14	102	74	294	93	6	6	46
.....	30	336	91	899	352	14	8	59
.....	* 3	331	143	1199	381	21	4	205
.....	27	320	133	1308	477	0	35	140
rd.....	9	227	86	579	297	38	3	67
ck.....	557	6169	2137	19538	9638	1307	422	3143
.....								95

aken from last previous returns.

CHITTENDEN COUNTY.

TOWNS

	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.	Total No. of Mules.
ton.....	23	122	60	524	179	7	2	43	
ite.....		* 490	* 64	* 394	* 95			* 101	
ier.....	109	586	113	1970	969	74	34	101	
.....	105	575	3	2283	916	37	5	192	
.....	70	557	34	2205	911	164	40	345	
urg.....	77	455	7	2396	684	5	16	147	
gton.....	26	274	0	1263	319	0	74	161	
.....	80	413	10	1857	592	33	3	146	
.....	* 0	* 636	* 252	* 5039	* 3907			* 1345	
nd.....	64	326	1	1879	512	92	16	70	
ne.....	61	240	331	1005	694	67	23	136	
Burlington.....	41	298	6	958	511	81	25	178	
ge.....	5	39	* 0	217	60	*	1	10	
ill.....	45	416	63	1957	666	34	18	146	
rd.....	63	392	41	2333	729	189	31	186	
n.....	57	376	49	2131	552	47	22	122	
ki (City of).....	2	65		48	10			14	
.....	828	6280	1034	28459	12306	832	310	3443	

taken from the last previous returns.

ESSEX COUNTY.

.....	10	183	60	250	99	7	2	57
.....	5	266	35	711	292	7	0	122
.....	*	51	*	84	* 119	*	0	* 19
.....	2	285	68	711	247	11	5	62
.....	14	375	105	1200	453	26	8	86
n.....	*	50	* 13	* 91	* 50	* 8	* 3	* 9
.....	3	44	35	90	46	2	3	15
.....	13	167	31	437	143	3	3	18
.....	10	78	27	214	82	1	5	29
.....	27	319	251	1195	391	159	25	83
.....	6	67	113	216	97	20	7	43
.....	*	2	* 117	* 259	* 226	*	2	* 28
.....	2	46	* 2	92	45	6	1	10
.....	96	2048	740	5550	2290	250	64	581

n from the last previous returns.

FRANKLIN COUNTY.

.....	35	407	64	1874	757	34	16	114
.....	59	441	57	3052	725	99	30	191
.....	60	603	61	3532	969	306	40	283
.....	*	53	* 462	* 17	* 2632	* 941	*	* 259
.....	77	586	164	4693	1212	28	17	165
.....	28	300	43	1514	459	10	5	167
.....	34	451	165	2625	652	108	35	364
.....	79	429	169	2286	871	44	9	124
.....	63	611	128	2232	813	8	3	241
.....	47	256	49	1719	427	19	9	261
.....	21	420	39	1819	250	7	8	117
ty.....	50	292	45	2501	612	120	42	164

FRANKLIN COUNTY—(Concluded).

TOWNS

	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.	Total No. of Mules.
City.....	* 1	* 235	* 0	* 40	* 0	* 0	* 0	* 27	
Town.....	91	569	56	1990	983	217	33	142	
.....	97	582	38	1420	518	350	42	209	
.....	795	6644	1095	33929	10189	1350	289	2828	

.....
 n from the last previous returns.

GRAND ISLE COUNTY.

.....	34	552	174	1325	516	0	13	102	
.....	54	364	271	1063	339	17	29	123	
.....	4	169	66	461	210	24	19	29	
.....	15	218	270	551	160	31	16	70	
.....	56	278	237	539	584	86	12	153	
.....	163	1581	1018	3839	1809	158	89	477	

LAMOILLE COUNTY.

.....	8	99	13	353	104	0	22	17
.....	81	573	108	2965	755	123	37	519
.....	8	262	98	836	310	*	4	74
.....	13	207	34	918	364	0	0	94
.....	29	455	40	1924	625	138	31	149
.....	83	452	81	1496	652	109	22	159
n.....	85	687	249	2922	802	113	57	248
.....	72	569	202	2596	741	180	11	378
.....	15	165	51	438	196	1	2	42
.....	43	309	57	1562	431	72	17	205
.....	437	3778	933	16010	4980	736	203	1885

n from the last previous returns.

ORANGE COUNTY.

.....	77	398	112	950	491	75	15	158
.....	71	333	198	1080	356	12	5	120
.....	102	431	160	1646	901	25	40	336
.....	80	420	319	1166	755	70	80	240
.....	41	378	60	1047	606	9	11	165
.....	* 24	* 164	* 76	* 399	* 253	* 25	* 4	* 118
.....	96	542	539	1941	1086	58	40	211
.....	25	236	60	517	322	137	17	87
.....	240	804	291	2903	1400	200	21	380
.....	48	276	135	772	763	37	23	130
.....	34	288	194	769	561	44	14	87
.....	46	322	96	931	552	102	37	164
.....	131	441	120	1253	902	178	41	267
.....	20	199	142	389	384	0	3	78
.....	46	277	71	673	328	46	15	117

n.

FRANKLIN COUNTY—(Concluded).

VERMONT

AGRICULTURE

Total No. of Mules.

Total No. of Hogs.

No. of Purebred Bulls.

No. of Registered Cattle Stock.

No. of Other Cattle Stock.

No. of Milch Cows.

No. of Sheep.

No. of Horses.

No. of Silos.

37	418	10	1597	19	0	91
7	159	71	751	40	4	252
4	380	91	191	13	10	400
7	170	1	287	19	10	32
13	267	169	2950	13	4	91
42	519	169	2950	13	4	91
26	* 418	* 34	* 1924	* 650	* 19	* 252
20	210	40	1600	400	15	8
3	124	92	435	115	17	10
525	6730	2239	29943	9200	1283	429
3213						

ken from the last previous returns

RUTLAND COUNTY.

63	328	783	1318	630	126	26	146
* 57	* 395	* 158	* 1158	* 732	* 42	* 30	* 189
43	256	56	891	387	11	8	42
27	195	90	540	273	65	7	80
31	143	277	1523	682	138	39	96
51	398	43	1566	726	6	6	127
21	198	47	474	130	30	10	45
37	198	367	672	160	0	24	44
13	130	62	440	245	86	7	53
17	108	9	258	99	1	4	24
30	215	291	715	368	59	15	65
32	243	33	1227	278	* 12	28	91
0	31	0	71	19	0	0	2
83	246	45	1708	375	231	41	72
27	120	34	305	151	4	0	57
* 85	* 450	* 194	* 2084	* 1000	* 0	* 76	* 132
54	234	84	2109	410	85	10	53
6	118	0	213	98	0	4	22
12	434	114	340	54	34	7	28
52	291	236	1253	552	131	12	102

1

City.
Town.

ORANGE COUNTY—(Concluded.)

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.	Total No. of Mules.
Irlee.....	17	160	74	382	239	14	4	77	
stownd.....	* 65	* 461	* 108	* 1264	* 978	* 54	* 15	* 263	
.....	1163	6130	2755	18082	10877	1086	385	2988	

taken from the last previous returns

ORLEANS COUNTY.

.....	50	364	85	1760	572	97	30	189	
.....	33	657	142	2332	539	85	20	155	
gton.....	11	152	49	550	327	4	4	94	
on.....	29	380	228	1628	542	29	17	257	
y.....	47	288	208	1642	386	24	43	66	
iry.....	60	63	1866	646	241	29	29	275	
.....	57	723	170	2884	1068	221	25	256	
.....	36	309	297	1663	532	168	40	240	
oro.....	39	395	187	1494	656	197	43	280	
.....	4	347	92	1483	371	14	105	140	

.....	37	418	210	2414	495	120	27	190
.....	7	159	10	779	297	0	0	30
.....	4	380	71	1597	698	0	6	159
.....	7	170	91	751	276	19	8	57
City.....	13	267	1	191	40	0	0	50
Town.....	42	519	169	2950	590	13	4	91
.....	* 26	* 418	* 34	*1924	* 650	* 19	* 10	* 252
.....	20	210	40	1600	400	15	8	400
.....	3	124	92	435	115	17	10	32
.....	525	6730	2239	29943	9200	1283	429	3213

en from the last previous returns

RUTLAND COUNTY.

.....	63	328	783	1318	630	126	26	146
.....	* 57	* 395	* 158	*1158	* 732	* 42	* 30	* 189
.....	43	256	56	891	387	11	8	42
.....	27	195	90	540	273	65	7	80
.....	31	143	277	1523	682	138	39	96
.....	51	398	43	1566	726	6	6	127
.....	21	198	47	474	130	30	10	45
.....	37	198	367	672	160	0	24	44
.....	13	130	62	440	245	86	7	53
.....	17	108	9	258	99	1	4	24
.....	30	215	291	715	368	59	15	65
.....	32	243	33	1227	278	* 12	28	91
.....	0	31	0	71	19	0	0	2
.....	83	246	45	1708	375	231	41	72
.....	27	120	34	305	151	4	0	57
.....	* 85	* 450	* 194	*2084	*1000	* 0	* 76	* 132
.....	54	234	84	2109	410	85	10	53
.....	6	118	0	213	98	0	4	22
.....	12	434	114	340	54	34	7	28
.....	52	291	236	1253	552	131	12	102
City.....								
Town.....								1

RUTLAND COUNTY—(Concluded.)

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.	Total No. of Mules.
.....	21	136	144	316	225	3	2	61	
.....	61	256	149	1153	335	85	20	128	
.....	34	212	480	759	369	11	1	95	
.....	18	197	32	845	484	107	11	86	
.....	46	310	260	1153	691	39	17	162	
.....	37	173	68	727	207	0	9	32	
.....	37	228	516	953	485	16	4	109	
nd.....	13	188	65	785	228	13	27	60	
.....	1008	6431	4637	25556	10373	1335	445	2203	

from the last previous returns

WASHINGTON COUNTY.

.....	3	240	0	238	41	0	1	27	
.....	43	284	7	911	581	116	37	137	
.....	68	406	60	1542	663	53	32	163	
.....	44	511	104	1624	594	163	24	200	

90	418	81	1522	721	174	38	321
27	105	7	*672	136	36	3	223
98	459	127	1787	772	110	29	501
41	148	2	481	170	41	10	93
49	399	439	1324	624	116	39	215
57	329	32	1135	612	62	14	194
13	398	*	541	300	45	*	103
55	305	62	1048	555	110	24	193
81	412	225	962	650	84	29	280
52	296	47	939	470	225	11	167
34	218	70	534	211	1	3	76
52	281	71	1244	731	273	59	162
41	215	9	697	407	11	14	125
65	485	78	1914	865	182	26	202
25	208	35	574	250	21	3	87
27	204	38	524	356	45	3	116
965	6321	1521	20213	9709	1868	407	3585

from last previous returns

WINDHAM COUNTY.

16	50	1	108	146	33	4	16
55	434	188	833	609	175	26	246
20	73	59	198	158	42	11	33
7	156	160	273	198	7	0	58
36	215	64	631	428	15	12	102
20	160	85	287	296	0	0	68
50	284	51	640	595	83	15	108
26	175	209	381	929	*	5	72
* 13	* 235	* 117	* 326	* 241	* 4	* 4	* 91
27	339	182	756	411	48	11	134
13	128	127	250	304	34	6	46

WINDHAM COUNTY—(Concluded.)

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.	Total No. of Mules.
.....	29	155	138	430	287	49	23	78	
.....	* 44	* 177	* 238	* 542	* 404	* 150	* 10	* 55	
n.....	24	374	328	833	614	2	45	170	
.....	* 0	* 14	* 0	* 7	13	* 0	* 0	2	
.....	* 0	* 59	* 6	* 36	* 37	* 0	* 1	* 11	
.....	* 20	* 263	* 141	* 504	* 578	* 0	* 0	* 109	
.....	56	164	23	494	292	207	21	61	
.....	9	157	93	285	222	2	2	51	
r.....	35	212	347	551	428	16	22	33	
n.....	36	268	385	660	477	72	15	107	
.....	35	353	421	886	831	106	24	141	
.....	11	121	41	239	188	20	1	44	
.....	582	4566	3404	10150	8656	1079	258	1836	
.....	from the last previous returns.								

WINDSOR COUNTY.

.....	30	132	29	392	167	6	5	33	
.....	5	47	29	108	64	26	4	17	

.....	64	274	171	799	446	115	23	122	
.....	65	330	160	942	601	67	4	175	
er.....	36	161	154	486	362	8	12	72	
.....	33	251	210	559	360	87	7	83	
.....	39	419	168	1002	657	85	12	125	4
.....	66	517	210	1481	966	364	22	339	
.....	126	401	276	1220	737	265	20	188	
.....	30	330	163	636	268	175	10	45	5
.....	59	437	144	1107	656	91	9	157	
.....	* 3	* 121	* 61	* 266	* 233	* 2	* 2	* 46	
.....	102	* 183	* 53	* 671	* 523	488	55	72	
.....	.....	* 166	* 241	* 243	* 187	.....	.....	* 82	
.....	54	303	516	824	540	40	13	164	
.....	101	491	119	1307	776	157	22	343	
.....	32	225	112	679	443	32	10	151	
.....	.....	583	87	1505	833	123	29	149	
e.....	37	227	174	550	286	4	4	125	
eld.....	.....	* 348	* 328	* 1088	* 728	.....	.....	* 189	
.....	16	177	102	535	283	4	1	83	
lor.....	61	269	176	938	605	* 210	37	41	
.....	35	233	119	596	272	102	22	49	
.....	50	618	486	1287	783	98	72	279	
.....	1044	7243	4288	19221	11776	2549	395	3129	9

n from the last previous returns.

SUMMARY BY COUNTIES, 1922.

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.	Total No. of Mules.
.....	985	6690	6149	22050	10709	1005	411	3152	
.....	297	3223	4451	8308	3930	175	83	957	
.....	557	6169	2137	19538	9638	1307	422	3143	
.....	828	6260	1034	28459	12306	832	310	3443	
.....	96	2048	740	5550	2290	250	64	581	
.....	795	6644	1095	33929	10189	1350	289	2828	
.....	163	1581	1018	3939	1809	158	89	477	
.....	437	3778	933	16010	4980	736	203	1885	
.....	1163	6130	2755	18082	10877	1086	385	2988	
.....	525	6730	2239	29943	9200	1283	429	3213	
.....	1008	6431	4637	25556	10373	1335	445	2203	1
.....	965	6321	1521	20213	9709	1868	407	3585	
.....	582	4566	3404	10150	8656	1079	258	1836	
.....	1044	7243	4288	19221	11776	2549	395	3129	9
.....	9445	73814	36401	260,948	110442	15013	4190	33420	10

REPORT OF VERMONT STATE FAIR COMMISSION 1920.

The Vermont State Fair was held on the grounds at White River Junction September 28 to October 2. The fair was held until Saturday night because of the heavy rainfall (3.65 inches) which occurred on Thursday.

The different departments were well filled. Entries of live stock included 171 horses, 373 cattle, 256 sheep, 75 swine and 1,395 poultry. The racing entries included 80 horses. Floral Hall, Mechanics' Hall and the machinery buildings were especially well filled and the exhibits were of a high order. Especially noteworthy was the exhibit made by the boys' and girls' clubs in the building set apart for their use.

The excessive rainfall and consequent inconvenience and hardship to which cattle exhibits were subjected called attention to the need for suitable facilities for housing cattle at the state fair. A recommendation was made for an appropriation of \$50,000 by the state for the purpose of providing adequate facilities to take care of cattle exhibits.

FINANCIAL STATEMENT

Submitted by **GEORGE E. MANN, Treasurer**

and

FRED L. DAVIS, Secretary and Assistant Treasurer

Dept.	Expended	Received	Dr. Balance	Cr. Balance
A—Horses	\$ 2,857.04	\$ 1,241.00	\$ 1,616.04	\$
C—Cattle	4,265.24	373.00	3,892.24	.....
D—Sheep	1,997.82	144.00	1,853.82	.....
E—Swine	631.35	152.00	479.35	.....
F—Poultry	2,605.07	465.00	2,140.07	.....
G—Horticulture and Fruit	783.06	133.00	650.06	.....
H—Machinery	10.00	155.50	.....	145.50
I—Education, Boys and Girls	865.28	.25	865.03	.....
J—Domestic Mfg., Floral Hall	639.33	359.16	280.17	.....
Administration	4,505.64	.....	4,505.64	.....
Admissions	690.46	26,925.75	.....	26,235.29
Attractions	3,046.60	.....	3,046.60	.....
Advertising	2,935.46	.....	2,935.46	.....
Auto Park	206.31	36.00	170.31	.....

Concessions	833.20	8,322.50	.....	7,489.30
Forage	1,587.93	1,085.16	502.77	.....
Maintenance	4,250.61	43.50	4,207.11	.....
Miscellaneous	489.61	85.07	404.54	.....
Permanent Improvement	419.17	.....	419.17	.....
Public Safety	1,062.38	.....	1,062.38	.....
Fair Ground R. R.	1,642.18	8.00	1,634.18	.....
Special Prizes .....	.....	205.83	.....	205.83
Speed	9,967.56	2,195.00	7,772.56	.....
State Appropriation .....	.....	5,000.00	.....	5,000.00
1919 Balance .....	.....	392.16	.....	392.16
	<u>\$46,291.30</u>	<u>\$47,321.88</u>	<u>\$38,437.50</u>	<u>\$39,468.08</u>
Total Receipts				\$47,321.88
Total Expense				46,291.30
<hr/>				
Cash Balance, November 30				\$ 1,030.58
Cash Balance remitted by check to State Treasurer.				

REPORT OF VERMONT STATE FAIR COMMISSION 1921.

The Vermont State Fair was held on October 3 to 6 on the fair grounds at White River Junction. The live stock exhibits included 529 entries of cattle; 96 horses; 224 sheep; 43 swine and 2,600 poultry. A large number of race horses were entered but some of the races proved not to be satisfactory to the public. All exhibits made in Mechanics' Horticultural and Floral Halls were very satisfactory and especially noteworthy was the Boys' and Girls' exhibit and exhibits made by the Fish and Game Department and the Agricultural Department.

The commission especially wishes to acknowledge its indebtedness to the Windsor County Y. M. C. A. which under the supervision of its secretary, Mr. A. C. Hurd, has conducted a public service building for several years at the state fair. At first this activity was carried on in a tent, but for the past six years the Y. M. C. A. has had a building of its own. In this building facilities are provided so that mothers can leave their children under the care of trained assistants and feel free to go about the fair grounds. An emergency hospital has been provided, with a doctor and nurse in attendance at all hours of the day. A rest room was equipped with every convenience and comfort, and it is estimated that it was visited by 8,500 people during the fair. These people came from 185 communities and from 13 states.

The appropriation of \$25,000 for the building of stock barns was vetoed by the Governor. However, the commission was able to make a great number of improvements during the year.

The town of Hartford showed a commendable spirit of cooperation in laying out a new back road to the fair-grounds, so that the movement of autos to and from the fair was greatly facilitated.

The old cattle barns were taken away from the space near the west entrance. The ox barn and pony barn and one of the Morgan horse barns were remodeled, so that facilities were provided for taking care of 400 cattle. A new building, 68 by 200 feet, costing \$5,630, was built on the site formerly occupied by cattle barns, and made available for auto exhibits. The rental from this building, was \$2,300.

Bleacher seats were erected near the stock-judging ring. All new buildings and several old buildings including the grand stand, Machinery, Floral, Horticultural, and Mechanics Halls were painted and were otherwise repaired. It is estimated that the total expended for permanent improvements was \$12,036.

Several improvements are still needed to provide adequate facilities for the State Fair. The commission would suggest that one of the first improvements would be moving Floral and Horticultural Halls across the race-track where they could be made over into sheep and swine barns. The two machinery buildings should be moved to the west side of the space occupied by the mid-way and one large building, 80 by 300 feet should be built, so that adequate space would be available for the exhibits now housed in these buildings.

FINANCIAL STATEMENT

Submitted by GEORGE E. MANN, Treasurer

and

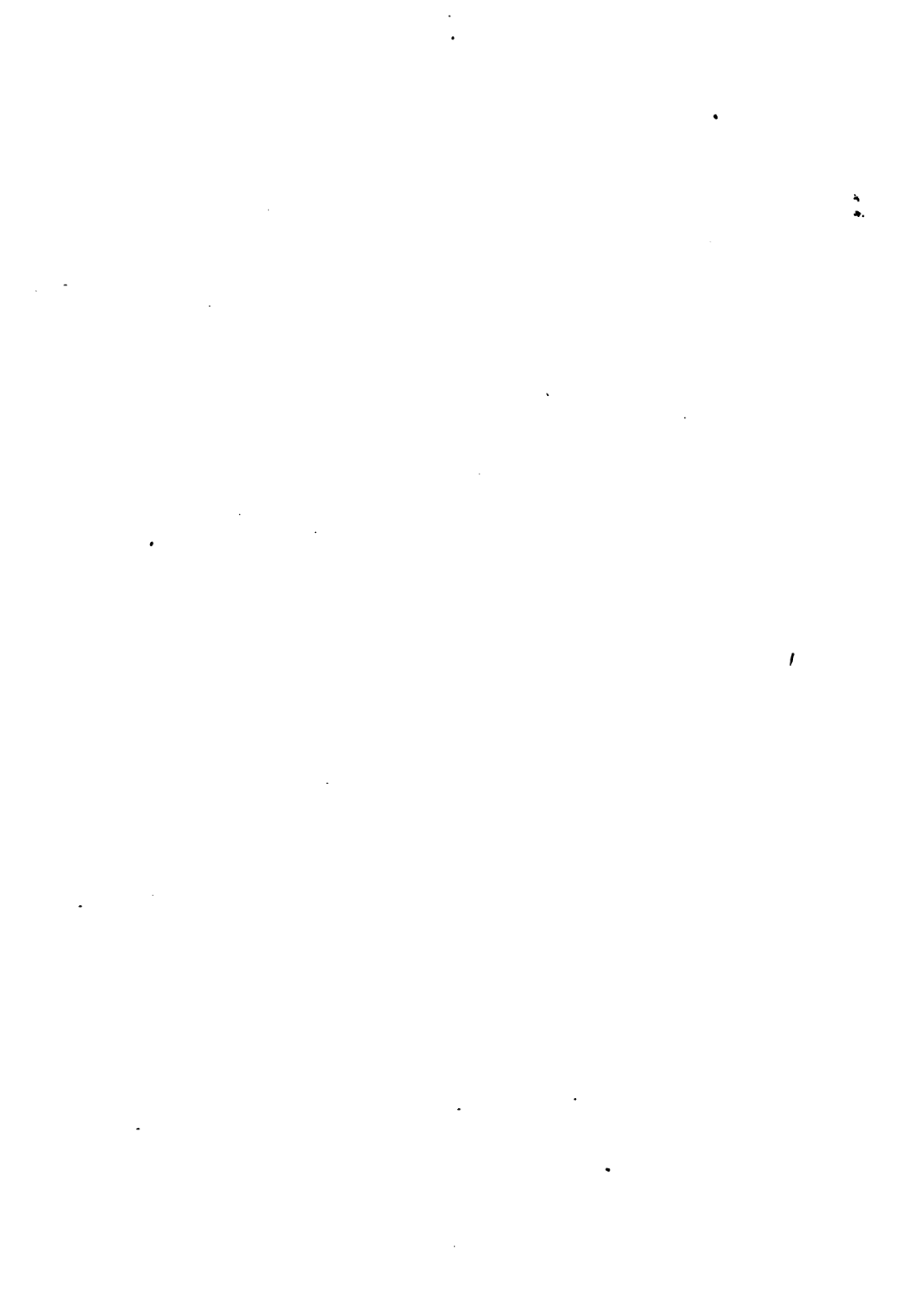
FRED L. DAVIS, Secretary and Assistant Treasurer

Premiums, Supervision and Judging.

Received	Received	Expended	Expended
\$ 429.00	Floral Hall	\$ 663.95	
	Boys and Girls	859.00	
45.00	Horticulture and Fruit	879.95	
287.00	Horses	1,478.51	

	3,305.00	Races.....	9,758.16	
	982.92	Cattle	5,181.46	
	119.50	Sheep	1,943.00	
	139.00	Swine	532.00	
\$ 6,210.92	903.50	Poultry	3,605.70	\$25,101.73
		Attractions		3,104.25
		Advertising		3,177.75
		Administration Department		3,715.46
30,928.11		Admissions Department		1,517.85
63.00		Automobile Department		231.00
9,673.09		Concessions and Priveleges		338.50
261.75		Maintenance Department		2,277.27
1,038.46		Forage Department		1,264.30
		Public Safety-\$908.09. Y. M. C. A. \$200.00		1,108.09
1,145.46		Railroad Department		2,712.49
		Permanent Improvements		12,437.52
205.00		Miscellaneous		838.83
14,055.31		Notes and appropriations-Auto Bldg. Note		6,000.00
<hr/>		<hr/>		
\$63,835.04	Total Received	Total Expended	\$63,835.04	
	One outstanding note	\$2,000.00		

F. L. Davis, Secretary





REPORT
OF THE
Fifty-second Annual Convention
OF THE
VERMONT
DAIRYMEN'S ASSOCIATION

HELD AT
University of Vermont Gymnasium
BURLINGTON, VERMONT
January 10, 11, 12, 1922



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**OFFICERS OF THE VERMONT DAIRYMEN'S
ASSOCIATION.**

PRESIDENT.

E. C. HILLISEast Montpelier

VICE-PRESIDENTS.

F. L. PARMALEE.....Putney
W. H. PORTERSharon

SECRETARY.

O. L. MARTINPlainfield

TREASURER.

W. H. HARRINGTONNorth Pomfret

AUDITOR.

F. L. DAVISHartford

PROCEEDINGS OF THE 52nd ANNUAL MEETING OF THE VERMONT DAIRYMEN'S ASSOCIATION

**THE GYMNASIUM, UNIVERSITY OF VERMONT, BURLINGTON,
VERMONT, JANUARY 10, 11, 12, 1922.**

The 52nd Annual Meeting of the Vermont Dairymen's Association convened at 2 o'clock, January 10th. President S. L. Harris presided. Rev. C. C. Adams, pastor of the First Church offered the invocation. Mayor J. Holmes Jackson welcomed the joint meeting of the dairymen and sugarmakers in the following words:

Burlington is again honored by this joint meeting of your associations in our city. We welcome you as organized bodies seeking to promote the industries here represented, and we welcome you as individuals having at heart the welfare of the State. Whatever tends to prosper your labors, also tends to prosper the State. This State is small in area, but it is forward-looking in its purposes, and from the day of the Green Mountain Boys at Ticonderoga until now, Vermont has ever proved her steadfast loyalty to the free institutions of our Republic. But you are here today not to study Statecraft; rather to consider how best you can further the worthy objects of your societies by increasing your output at the least reasonable cost. As farmers you are primarily interested in the activities of your several industries. These industries, well directed, and operated on an economic and efficient basis, increase your own prosperity and add to the wealth of the State. The successful dairyman brings to his financial aid the profits of the sugar orchard, if he owns or controls one. The wise farmer does not let his tillable and pasture land to be overgrown with brush, nor does he sell his sugar trees to make hard wood flooring. No natural or acquired industry should be made to suffer for temporary gain. The state largely depends upon the farmers for its permanent prosperity. It is essential to our greatest prosperity that every acre of tillable land should be so cultivated as to produce the largest returns

possible, consistent with good husbandry, and that every maple sugar tree should be preserved and all young maple trees giving promise of becoming producers of maple sugar be carefully nursed. You farmers have it largely in your hands to add to the prosperity of all our people, producers and consumers, and also to add to the prestige of the State.

I hope you each and all will have a most profitable meeting; and now, as Mayor of this city, which shall be for the time you are here, also your city, and on behalf of all our inhabitants, I bid you a most hearty welcome.

U. A. Woodbury, 2nd. of Burlington, responded for the dairymen.

He said:

It is indeed nice of Mayor Jackson to extend to us such a warm welcome at this time and we certainly appreciate it.

Burlington has always been a great friend of the farmer and I think is becoming an even warmer one as the frequency of these dairymen's meetings, held in her midst, keeps her continually in touch with us. I happen to be a citizen of Burlington, and know that it is a thing to look forward to and a great source of enjoyment to have this big home-coming of friends and acquaintances. The meeting with some of our more distant neighbors and the rubbing of shoulders with the different farmers of the State is alone worth the effort of making the annual pilgrimage to the Vermont Dairymen's meeting. Each year the farmers come in ever increasing numbers to get the latest "dope" on their farm problems. Farmers probably have more problems to solve than any other class of men and with the steady advancement and changes in the work of dairying, we need to take every advantage offered to keep in the swing of things. Many of the things we hear at these different meetings may not fit our individual needs, but if we hear the different views experienced men present, often times new ideas, that are applicable, come to us and we gradually solve our own individual problems.

The importance of dairying in the State can perhaps best be realized when one remembers that, considering population and area, Vermont leads every state in the union in the number of dairy cows and in the quality of milk produced. That is rather a big statement to make, but not only has it been true for a number of years, but it is still true this year, according to the latest census.

Vermont also leads other states in her determination to have her herds clean of tuberculosis and has already attained such marked success, that the demand for cattle from Vermont is very keen, especially when the prospective buyer is desirous of procuring the cleanest animals possible for herd foundation purposes, and to go into herds where certified milk is produced.

All things considered Vermont is not a half-bad place in which to live, and if we stand together behind this organization and similar ones throughout the State, we'll keep Vermont in the limelight even more as a dairying State, and incidentally do ourselves a good turn besides.

Tuesday evening's program was in charge of The Vermont Milking Shorthorn Breeders, who featured their breed. The meeting was held in the Van Ness dining room, and was participated in by Messrs. Martin, Simpson, Gregg, James, Robbins, Lee and Stockwell.

Wednesday Morning Session was devoted to the Maple Sugar interests.

WEDNESDAY AFTERNOON SESSION.**PRESIDENT'S ADDRESS.**

Ladies and Gentlemen:—

We meet again, for the 52nd annual convention of the Vermont State Dairymen's Association.

It is with pleasure that we speak of Vermont as a Dairymen's State and the progress it has made and is making in agriculture and dairying. But little attention had been given to increasing the capacity of cows or improving the methods of dairying until about the time two inventions to the dairy industry were developed. First, the cream separator. Second, the Babcock Tester. The usefulness of these two inventions was soon realized and in a short time creameries were built in every section of the country. With almost universal use of the separator and the Babcock tester came added interest in the improvement of dairy cattle.

In looking back for a quarter of a century or more there were no thorough bred stock and no knowledge of care and feeding in those days as there are today. Among the improvements are the wonderful farming machinery of all the different kinds to help the farmer on his farm, and the cream separator, the creameries, cheese factories and the good butter and milk markets to help him get the highest prices for his cream and milk in the different ways he may see fit to dispose of it.

I believe the farmers of Vermont today are in a position to make Vermont one of the leading states in breeding pure bred stock, as a great many of our farmers are beginning to realize that the thorough bred stock is what pays. The thorough bred cow is like first class butter, you do not have to look for a market, the market is always looking for a first class article. We have read of the large records made by our great cows with little thought of the intelligence and work required to produce them. The farmers who have shown the ability and the energy to produce, breed and develop world record cows are men of unusual talent and are greater forces for progress than has been generally recognized. These records are the results of skill and hard work and *may they stimulate*

every breeder of dairy cattle and farmer, who keeps cows, to try to raise their standard of production.

The farmer who makes a success of farming today is the man who watches his cows individually to find out what each cow is doing and what they can be made to do in producing a good amount of milk and cream. We all know that farming is subject to weather conditions and other difficulties. It is never a guaranteed proposition. Diversified farming is the only safe method. In Diversified farming you have a good income from the sale of dairy products and the growing of hogs and cattle. Some kind of livestock farming must be followed in order to renew the fertility of the soil. The different experiences in different sections are not altogether due to varying soil and weather. Other factors determine results. This past year we had unusual heat and poor crops with the exception of corn which was more than an average. We find, where farmers practice planting or sowing different crops on different pieces of land than they did the year previous, that results are better. The same with live stock growing, particularly dairying with a number of good milk cows on the farm is successful. Not only does the dairy cow give the farmer a dependable income, but as I have said before she also helps to maintain the fertility of the soil.

The farmer must not overlook the necessity of the type of animal to be kept on his farm. The best cow is what we want and must have. What has been accomplished in dairying has been with the average cow. We find that these cows produce an average of about 4,000 lbs. of milk a year. But there are cows that can produce 25,000 lbs. or more of milk and from 900 to 1200 lbs. of butter fat per year. These great producing cows show the way to successful farming. They respond to care and feed and make the farming enterprise profitable. Therefore, improve your herds and place cows of this type on your farms.

In connection with this the farmer must consider the matter of dairy equipment. Good stock must be properly housed in comfortable barns, and these must be equipped properly, to handle and care for the cows and milk, easily and economically. Sanitary barn, cream separator, milking machine, ventilating system and silo have all become necessities for the efficient conduct of modern dairy farming.

In good times it is not always easy to prove what methods of farming are most successful, but when adverse

conditions and poor years come everything is brought to a standstill. Right now it is possible for us to see what is safe and dependable. The importance of dairying to the farmer has never been so impressed upon us as at the present time. It seems as if the lesson to the American people and American farmer is full and complete.

REPORT OF SECRETARY AND TREASURER.

RECEIPTS AND EXPENDITURES OF THE VERMONT DAIRYMAN'S ASSOCIATION, 1921.

W. H. HARRINGTON, Treasurer.

RECEIPTS.

Cash on hand	\$ 852.12
Membership fees	143.00
Space rented and Advertisements	578.00
State Appropriation	1,000.00
Hotel Vermont, error in bill .....	.98
Mrs. H. J. Wright, Ladies Aux.	79.88

Total receipts\$2,653.98

EXPENDED AS FOLLOWS.

Jan.	3	White River Paper Co.....	\$ 1.94
	7	A. M. Harrington.....	5.00
	7	W. H. Moore.....	1.50
	9	O. L. Martin	45.14
	10	Hagar Hardware Co.	2.60
	13	Miss G. S. Smith	71.30
	13	Orrin Bent	48.37
	14	Hotel Vermont	140.23
	18	Dennison Mfg. Co.	41.29
	18	Capital City Press	162.50
	18	Miss Cecelia Mossowitz	33.00
	18	Bogle Bros.	33.26
	19	W. H. Harrington	42.32
	24	White Entertainment Bureau	70.18
	31	Burlington Daily News	5.00
Feb.	9	W. P. B. Lockwood	56.44
	9	Ernest Bancroft	25.00
	9	A. A. Borland	79.86
	14	S. L. Harris	18.50
	14	Mrs. H. J. Wright	100.00
Mar.	28	S. L. Harris	5.00
Apr.	28	J. P. French	4.48

May 3	M. J. Corliss	34.00
June 20	Capital City Press	6.75
July 24	M. J. Corliss	25.00
June 13	L. F. Grammes & Son	3.60
Aug. 3	O. L. Martin, salary.....	175.00
25	O. L. Martin	20.00
Nov. 2	O. L. Martin.....	27.02
	Transferred to premium fund,	210.50
		<hr/>
Total expense		\$1,494.78
Cash in Bank to Balance		1,159.20
		<hr/>
		\$2,653.98

1921

PREMIUM FUND.

Received for Butter	\$ 84.00
Transferred from General Fund	210.50
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	\$ 294.50
Paid for 147 1-4 points at \$2.00	294.50
Two Cups	33.26
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Total Premiums paid	\$ 327.76

The report was accepted and adopted.

IMPROVEMENT OF OUR DAIRY CATTLE THROUGH BREEDING.

BY C. L. BLACKMAN, FIELD SECRETARY.

NEW ENGLAND STATES HOLSTEIN FRIESIAN ASS'N.

Mr. Chairman and Members of the Vermont State Dairymen's Association:

It gives me great pleasure to be with you at this time and to see so many men and women who are so interested in Dairying, that they come together in a large group to discuss their common problems and to gather inspiration.

The breeding of livestock is one of the most interesting features of the farm business and at the same time it is one of the most reasonable sciences that is practiced on the farm. If we should go back before the time of history we would find that the various breeds of cattle which we have today arise from one cow or herd of cows. That animal, doubtless, had more of the characteristics of the wild red deer of today than of the modern Dairy cow. This animal was of such a form as to be able to protect herself against her enemies, and to be able to reproduce and nurture her young. She, therefore, probably was a cow lacking the great body development, and capacity, that we find in our modern Dairy cattle. She was able to produce only sufficient milk to feed her calf prior to the time that it was able to go out and seek its own living. If we should place a herd of our modern Dairy cattle in ordinary wild conditions and leave those animals to live and reproduce, we would doubtless find after centuries that the most undesirable types so far as modern Dairy standards are concerned, would persist, due to the fact that those animals with the large bodies, and larger udders, would fall prey to wild animals and diseases. Those animals with long legs, shallow bodies, and giving little milk, would persist, as they would be able to keep away from their enemies and would be less subject to the other troubles of highly developed animals. Our forefathers in their wisdom and skill were able to select and breed together those

animals with the most desirable characteristics, and they have developed the modern breeds of cattle.

In developing the beef breeds, no doubt, those cattle that were more thickly fleshed were bred together to produce the beef cattle. Those animals that showed the capacity for Dairy production were bred together to produce that type and in the same way the different breeds were developed, laying emphasis on breed characteristics. If we are to continue to have good and efficient Dairy cattle we will have to continue with the selection which our forefathers started.

It will be a long time before all of the Dairy products that are consumed will be produced by pure bred Dairy cattle and inasmuch as it is very practical to develop a high type of grade cattle I will discuss some of the methods used in developing the grade Dairy cows. The most important factor in this work is the use of good high quality Dairy sires. It is said that a bull is half of the herd, and it is also said that if he is a poor one he is the whole herd. Therefore, it is very important to use good sires in the development of our Dairy herds. It is not difficult to see how we can develop a high class of Dairy animal from the poorest scrub herds that exist, by the use of purebred sires. A scrub cow when mated to a purebred sire will give birth to a calf that is technically known as a grade, which will contain 50% of the blood of the purebred ancestor and so a half-blood is produced. If this half-blood animal is bred to another purebred sire of the same breed the progeny will contain 75% of the breeding of the purebred animals used, and moreover, this animal will contain the external and internal characteristics of the purebred animals and we find many high grade cattle that will produce as efficiently as many of our purebreds. If this process of grading up is continued for seven generations an animal will be produced that contains more than 99% of pure blood and less than 1% of the scrub breeding, and so it is not difficult to see how efficient grade herds may be established with a very small cost of using a purebred sire.

A few years ago the Iowa State College of Ames, Iowa, decided to demonstrate to the farmers of that state and the world that a highly efficient grade herd could be built up by the use of purebred Dairy sires on a herd of the poorest scrubs that could be found. Accordingly in 1907 a man was sent to the Ozark hills of Arkansas to select 13 of the most inferior animals he could find, and I am here to tell you that the man who made those selections

was certainly most successful in his work. It was my privilege to see some of those animals and they had all of the characteristics that we do not desire in the Dairy cattle, and a few of the characteristics that we do desire. They were rough and irregular, with crooked backs and sloping rumps, with high pelvic arches. They were wasp-wasted, and their udders, in some instances, were only the size of a man's hat. These animals were taken to the College farm and fed and handled the same as the purebred cattle in that herd, and they were not pampered in any way. While this is aside from the subject of today I never like to pass this point without mentioning it. After the animals received the treatment accorded the purebred animals in that herd, the average production of those scrubs was 182 lbs of butterfat in a year, which is probably about 30 lbs more of butterfat than the average cow in the state of Vermont makes. Certainly your cows are better than scrubs from Arkansas, but the reason is that too many of our cows are poorly fed. These scrubs were bred to purebred sires of the Jersey, Guernsey and Holstein breeds. At that time there was no Ayrshire herd on the college Dairy farm, and for that reason no purebred Ayrshire sire was available. It is safe to assume, however, that Ayrshire bulls would have produced the same results as the other breeds.

The original scrubs on which a Holstein sire was used produced 3,674 pounds of milk and 167 lbs. of butterfat in a year, on the average. Their daughters by a purebred bull produced 6,758 lbs. of milk and 276 lbs. of butterfat a year on the average. Their daughters by another purebred bull produced 10,064 lbs. of milk and 385 lbs. of butterfat a year on the average. The scrub cows upon which a Guernsey bull was used produced 4,497 lbs. of milk and 388 lbs. of fat. milk and 200 lbs. of butterfat. Their daughters by a purebred bull produced 4,844 lbs. of milk and 230 lbs. of butterfat a year. Their daughters by another purebred Guernsey bull produced 7,735 lbs. of milk and 200 lbs. of butterfat. Their daughters by a purebred bull produced 4,844 lbs. of milk and 230 lbs. of butterfat a year. Their daughters by another purebred Guernsey bull produced 7,735 lbs. of milk and 388 lbs. fat. The original scrubs upon which a Jersey bull was used produced 3,394 lbs. of milk and 173 lbs. of butterfat a year, on the average. Their daughters produced 5,461 pounds of milk and 298 lbs. of butterfat a year on the average. There are not yet sufficient daughters with records of the 2nd Jersey cross to give definite figures

on their production, but no doubt the 3d generation will show an increase over the 2nd. It often happens that the data from our Experiment Stations is criticised because it has been obtained under other than regular farm conditions. Generally this criticism is unjust, but in order to demonstrate that what has been found true in this instance has also been found true to work out on other farms, I will take this opportunity to cite a few instances where highly produced Dairy herds have been produced by the use of purebred Dairy sires. In one of the cow-testing Associations in southern Iowa, was a very progressive farmer, Ernst Denglar: He began to establish his herd with a very ordinary group of native cows, by the use of a purebred Guernsey sire, and built up a herd of grade Guernseys which averaged 388 lbs. of butterfat in the year and approximately 8,000 lbs. of milk. Mr. M. B. Knop of Black Hawk County, Iowa, built up a herd of purebred Holsteins which produced on the average of 330 pounds of butterfat per year. Another herd which came to my attention in that part of the country was a group of grades and purebreds which was the result of constructive breeding of the owner, and produced something over 400 lbs. of butterfat a year on the average. Mr. John Garrity & Sons of MacGregor, Iowa, have built up a herd of grade Jerseys since 1912, by the use of purebred Jersey sires, until their production is now about 400 lbs. of butterfat a year and these men have hopes of increasing their production to 500 lbs. What has been done in Iowa has also been done right here in New England, and can continue to be done if we will but follow the same principles that successful breeders have followed.

There is one other feature in connection with the breeding of a herd, which may be classed as a matter of breeding and management. In order to obtain the best results it is necessary to do more or less culling, for even where the greatest care is taken, inferior individuals are bound to creep in and the ultimate value of these animals must be determined by the scales and the Babcock test. One of the best instances of the necessity for selection that has come to my knowledge and observation is the case of a herd of Guernseys, owned by Glen Wellman. When this man became a member of the cow-testing Association he was milking 16 grade Guernseys. One of these cows was discarded because of some accident. The other 15 cows averaged 208 lbs. of butterfat a year. When the records were analyzed it was found that 4 cows were making 128 lbs. of butterfat a year, and, of course were

culled out because they were unfit to be in any herd. The culling of these cows automatically raised the average production of the cows to 235 lbs. of butterfat. Another instance showing the need for selection is furnished by the case of a pair of $\frac{3}{4}$ sisters and another pair of $\frac{1}{2}$ sisters, owned in a purebred herd with the pair of $\frac{3}{4}$ sisters. The record of one was 9,910 lbs. of milk and 458.9 lbs. of butterfat as a two year old. The record of the other as a two yr. old was 5,364 lbs. of milk and 264.1 lbs. of butterfat. The other two cows that were half-sisters, being out of the same cow, the record of one is 9,508 lbs. of milk and 420 lbs. of butterfat at 3 yrs. while the record of the other was 6,186 lbs. of milk and 299.6 lbs. of butterfat. If cows as closely related as these vary so in production certainly it is necessary to carry on culling in the average herd, where animals are not often as closely related as this.

Now I would like to make a few remarks regarding some of the fundamentals in the breeding of purebred Dairy cattle. In establishing a purebred herd the first thing to decide is what breed shall be chosen. In considering this matter the market demands the adaptability of the cattle to the location, and popularity of the type of cattle that are being used in that community. Probably the most important thing to consider is what the community itself is doing if that community has already begun to develop in a purebred way. It will be far more profitable to breed Jerseys in Jersey territory, and Holsteins in Holstein territory, than to isolate one Holstein herd in a Jersey territory. It is of course possible to establish two breeds in the same county, for example, or even more in large communities but it will be found of great advantage to group as closely as possible breeders of the same breed. There are several reasons for this; in the first place where your community is interested in one breed, it can advertise through papers, through its organization activities and advance the breed that it is fostering. This community can purchase purebred sires of high quality, co-operatively. When the breed has been definitely chosen the last thing is to select the foundation animals of any well established breed, and these selections should be based chiefly upon the character of the animals chosen regardless of pedigrees or other fancy points. In selecting the foundation animals of any well established breed, it is only necessary to be sure that you are securing animals whose registrations have been kept accurately. If the animals chosen are good individuals, showing straight tops, level rumps, large capacious bodies, well developed mammary systems, it

is safe to assume that the pedigrees of these animals are good although in many instances the ancestors might have had advanced registry records. Some of the most popular families of today have arisen from cows who were good individuals but whose pedigrees were called plain before their development. After the foundation females have been selected it is then highly important to select a sire who is not only a good individual, himself, but who comes from a line of good individuals of known producing ability. The purebred breeder should be a constructive breeder and should improve the cattle on his place just the same as the grade breeder improves the cattle on his, through better and better sires. In order to realize the full profits of purebred cattle it is necessary to keep production records and especially semi-official records, supervised by the breed Associations through the several agricultural colleges. Unless this is done the bull calves from purebred animals will be worth but very little more than the grade bulls and if the purebred herd is to pay what it should, the surplus bulls and cows must be sold at a reasonable figure. So far as the Holstein breed is concerned and that is the only breed that makes short time records, I believe that a cow-testing Association record is more valuable to assist constructive breeding than is the shorttime records which may or may not indicate the producing ability of an animal. I hope that the time will come when no shorttime records will be made in the Holstein breed. I have merely outlined here some of the important uses which should be considered in the constructive breeding of livestock and if these most important principles should be followed, the result would be an enormous increase in the production of the individual cow.

THE PRODUCER AND QUALITY

PROF. A. W. RUDNICK, SUPT. DAIRY EXTENSION, IOWA STATE
COLLEGE, AMES, IOWA.

The dairyman has been presented with an opportunity such as no other industry has had and the question is, will he grasp it and make the most of it. The country has been awakened to the fact that dairy products are vital to its welfare. When the physical examination of our men was made during the war there were found a large number of defects which were due to malnutrition or improper feeding during childhood. Then come our scientists and show us how milk and its products, when used in the diet, can prevent some of these defects. Dairy products are receiving valuable advertising in the schools, women's clubs and civic organizations of various kinds, due to the fact that their value is being recognized. Now here is the opportunity of the dairyman if he will build and hold the quality so that his products are palatable and appetizing, the demand will be such that a good substantial increase in production will not swamp the market. If, however, a high standard product is not put on the market there will be a slump in the consumption. It will be the same old story, "yes, we know milk is good for our children but they do not like milk", or "yes, we know we ought to use more butter but we cannot get butter that tastes right."

It is a fact that people do not eat what they should for body requirements so much as for the taste. Take for instance round steak and porterhouse steak. When you say round steak you think of a certain type of meat. When you say porter house steak it brings to mind a good dinner, it makes your mouth water. It is up to the dairyman to bring the quality of his products to such a standard that when one says milk, butter, cheese, it will make one's mouth water and cause one to stop at the first eating place or soda fountain and ask for a glass of milk and a cheese sandwich with lots of butter. When you think of butter do you think of lots of bread and little butter or little bread with lots of butter? This quality proposition is the biggest problem that we as dairymen must meet. Too many of

us have been saying, "well, as long as there are no complaints what is the use of making any extra effort?" In other words we were trying to give just as little as we could for just as much as we could get.

We are facing a new order of things at present. Dairy products are among the highest and most profitable farm products, giving good returns as compared with other farm products. Naturally there are a large number of farmers going into the dairy work. During the war, especially in the middle west, when labor was high priced and scarce, many cows were allowed to dry up or the calves turned in. During prosperous times dairying is neglected as a part of general farming. Our middle western farmer did not come back to the cow immediately after the war because grain and other farm products were selling at unheard of prices. In fact our farmers and business men were so busy buying automobiles and blue sky that the cow was a very neglected creature, in fact she was becoming obsolete. Then over night things changed. The bottom fell out of the grain market and renters disappeared from the farm over night. Then we have this,—a farmer of Iowa, who lists his liabilities at \$35,620 and his assets \$16,895, of which he says \$600 is exempt, filing voluntary petition of bankruptcy in federal court. This is not an uncommon case. Two others were posted in the same paper. Sheriff sales of Iowa farms, unheard of things, are getting to be common. Yet these conditions do not exist in the dairy districts.

Most of the dairying in Iowa is done in the north-eastern quarter, here the banks do not feel the pressure as in other parts. There bankers are optimistic as to the outcome of the present situation. At Hanlontown, Iowa, a town of 400, the banks have a deposit of about a half million. At Tripoli, Iowa, a town of 800 there is in deposit about \$1,000,000. The merchants here and in neighboring towns report business good,—not as lively as a couple of years ago but good. In the southern part of the State business is very poor,—banks are not only withholding loans but are forced to call loans. Everyone is dreading settlement day, March 1st. Under such conditions the farmer must provide himself with some means of ready cash and this means in most instances the dairy cow and in Iowa for the most part selling of cream for butter making.

In order to meet such a situation when the production is bound to increase, provision must be made to increase the consumption and our idea is that we can do more by putting out high quality products than in any other way. Adver-

tising and marketing must not be neglected but of the three the quality is by far the most important. It makes no difference how you are selling your dairy products whether in the form of milk, butter or cheese, you must do your part to bring these to the highest standard possible.

Our dairy department is preaching the gospel of quality to its students, a large part of whom return to the farm. Thru the extension department by working with the creameries we are endeavoring to bring the quality of Iowa butter to the highest notch. That we are making progress is shown by the fact that Iowa buttermakers carried away the Banner for the high ten entries at the National Creamery Buttermakers' Association last fall. The college does not pretend to be the cause of this victory but quality work is taking hold and we feel that we are progressing.

The college has cooperated with the Iowa Buttermakers' Association in conducting a cream improvement contest. This contest is for the purpose of getting good milk houses, cooling tanks established and getting separators moved from cellars and barns to more sanitary places. This work has been conducted for five years and at the end of each year cash prizes are awarded to the buttermakers having the highest score for the year. Fifteen points are allowed for each milk house, ten for each cooling tank and ten for moving a separator from an insanitary to a sanitary place. At the end of the year the buttermaker makes a list of the patrons and makes affidavit to same. In this way there have been several hundred milk houses built, over five thousand cooling tanks installed and several hundred separators moved to sanitary places. The creameries doing most of this work are improving the quality greatly.

The extension department is at present employing two men who work with the creameries. Two men among 400 creameries is not many but at that a great deal of good can be accomplished. We are working thru the creameries by means of scoring contests for milk and cream. These contests are worked cooperatively between the creamery, county farm bureau and college. The creamery agrees to conduct a contest, the county agent keeps all records and the college furnishes the dairy manufacturing specialist for judging. The milk or cream is scored once a month from 6 to 12 months. No one is notified as to when he will be at the creamery. He goes thru every lot of milk or cream. Judging the cream on the following basis: Flavor 45, acidity 25, richness 20, body and cleanliness 10. Flavor is judged according to the type of butter which can be made under the best system of manufacture including

pasteurization and addition of starter. The value of flavor is set the same as the value of flavor of butter. Acidity is scored perfect when the cream contains less than .2% acid. Three points are deducted for each one-tenth increase over two-tenths. Richness is scored perfect when the cream contains 28% of butter fat or more. One point is deducted for each percent below 28. The body of the cream must be smooth free from lumps and curd and the container must be clean, free from rust and have no open seams.

The weak point of our whole scoring work is the lack of bacterial counts. But with the volume of work we are handling it would make a very expensive project to include bacterial counts. During the past nine months Mr. Brunner and myself have scored about 25,000 samples in 18 creameries reaching 2,800 farms. That the raw product and the finished product is showing improvement in every creamery thru which we are working indicates that our system is practical and successful. During the coming year there will be three men available for this work and our problem is to fill all the requests for this work. We will have to drop some of the creameries with which we are working and take up the more needy ones. The creamery usually puts up a prize list either in the form of cash or donations from the merchants in the vicinity, its patrons or those doing business with it. The type of prizes vary from cash and merchandise to high pure bred dairy cattle and swine. The county agent keeps the records of the scores by number only and furnishes each patron thru the creamery with a score card of each scoring. A letter containing some important phase of the quality problem affecting the creamery is sent out with each score card. In this way we reach a large number of producers repeatedly and have an opportunity to watch the progress of the work. At the end of the year the results are charted and presented at the annual creamery meeting. At this time it can readily be seen whether the quality of butter made conforms with the quality of milk or cream received. We do not hesitate to tell the creamery to change buttermakers if conditions warrant. In most cases, however, the quality of butter turned out is parallel to the quality of milk or cream received.

All of this type of work has been done thru the co-operative creamery of which we have two types, the mutual cooperative, and the joint stock company. Both types with very few exceptions are operated on a true cooperative basis that is all income is prorated per pound butter fat after operating expenses are paid. In these cream-

eries an increase in returns is felt at once. There is a considerable difference in prices paid for butter fat in our state. The least profitable way of selling butter fat is through the cream station and last winter there were instances where the cream stations were paying 30 cents per pound butterfat less than some of the cooperative plants. As a rule the cream sold thru these stations is of poor quality and it is an expensive system of marketing. Usually the stations pay from 8 to 10 cents less than the cooperative creameries. That the centralizer can pay as close as this is mostly due to the fact that he markets his goods on special markets or trade. He gains nothing on efficiency of manufacture but does when it comes to marketing. Then there is a considerable difference in the price received for butter by the different cooperative creameries. The quality again plays a factor, there are creameries paying 8 to 20 cents less per pound butter fat than other creameries partly due to management, but mostly to quality of goods received and turned out. One of our large cooperative creameries just this last month took the stand that they were going to produce high quality goods or shut the doors because the latter would occur anyway. They have a good buttermaker and he has orders to accept only such cream as will make fine butter and none other and now he has no one to blame but himself if he does not turn out fine butter.

When we go to a creamery the first thing we do is to give out a small pamphlet on the care of cream on the farm. The opening statement of the pamphlet is "put your cream in cold water and keep it there until you are ready to deliver it." We issued the pamphlet on cream because that is our largest output. This statement, however, applies to milk as well as cream. Water cools about 48 times as fast as air, and the sooner the animal heat is taken out the better the milk or cream will keep and taste. Bacterial growth is practically checked when the temperature is below 50°F. The temperature of the well water in Iowa is from 48° to 52°F. Now then, if a tank holding from one to two barrels of water is placed between the well and stock tank so that all the water for the stock first passes through this tank it makes an excellent refrigerator for keeping cream. In case milk is kept a larger tank is provided. The tank is made of two inch lumber or four inches of concrete and provided with a good cover made of two pieces of one inch lumber with a piece of building paper between. Where the farm has a good cold spring the

tank should be connected with the spring. The tank should be placed in a milk house.

The utensils are the chief source of contamination, the buckets, the cream separator, milking machines, cans, etc. The buckets and cans should be washed with cold water, then with warm water and a mineral washing powder (soap, soap powders, and washing powders having odors give considerable trouble). Then they should be scalded and placed in the sun if possible so that the sun will shine into them, not on them. Some of the finest and some of the poorest milk and cream which we score comes from farms where the milking is done with milking machines. At one farm, where the cream had an average score of over 94, milking was done by machine. All parts were thoroughly cleansed and scalded after each milking. At night the tubes were placed in clean cold water, in the morning the parts were washed, boiled and left to cool in the water. On another occasion some milk being used for starter was so poor that a trip to the farm was necessary to correct the fault. Here they were not washing the parts but merely rinsing them after milking at night, then placing the parts in chloride of lime solution. Instructions were given to wash all parts night and morning and keep the tubes in lime water containing a little salt. The trouble stopped. No doubt the washing had something to do with this. Just what effect the lime had we are not ready to say as we are experimenting with this at the present time. There is no doubt that the milking machine is going to be a large factor in increasing production of dairy products in the middle west. The Iowa State College has called a conference of milking machine representatives for the middle of next month to draw up if possible a set of rules for sanitary care of milking machines, so that we will all be talking the same language.

A farmer who has produced a very fine grade of cream during the past year was asked by his neighbors to tell how he produced his cream. His reply was "Common sense and cold water." Keep your utensils clean and sterile, your barn clean and well ventilated and then cool the milk and cream so as to get the animal heat out of it and never mix warm and cold milk or cream.

The production of fine raw product is the problem of the farmer. Unless high grade raw material is provided high grade market milk, butter, cheese or any other product can not be turned out no matter how skillful the operator. If, however, high grade raw material is fur-

nished high grade products should be turned out or there should be a change in the personnel of the plant, for it is a fact that poor workmanship can ruin the best of raw material and poor workmen are expensive at any price. In closing, high grade milk and cream, good modern equipment, plus skilled operators make a combination that will cause an increase in consumption of dairy products thus avoiding a surplus and bring highest returns.

PRODUCTION OF MILK POWDER.

E. D. ROGERS, DETROIT, MICHIGAN.

Milk powder is milk in its most concentrated form. It is produced either from whole or skimmed milk. Skimmed milk powder is in most general use, owing to its superior keeping qualities. We believe the Viscolizer or Homogenizer is another reason for skimmed milk powder. The ice cream manufacturer equipped with these machines doesn't much fear a shortage of fat solids.

Whole milk powder, generally speaking, has about the same keeping qualities as good butter. It is the ultimate rancidity of the fat that eventually renders the whole milk powder unfit for use. The time the powder will keep in good condition starts with the quality of the whole milk. The moisture contained in the powder is another governing factor, and, of course, the conditions under which the powder is stored. It may keep a few weeks, or again it may keep several months. It is owing to the uncertainty of keeping qualities that most manufacturers produce the skimmed milk powder.

In many instances skimmed milk powder is a means of disposing of surplus milk. Many of the large city milk distributors and ice cream manufacturers produce milk powder purely to take care of surplus milk, using what portion of this powder they require in their own business and disposing of the balance.

In the early days of the industry practically all of the milk powder was what is now generally termed the "Roller Process." This was produced by putting a thin coating of either fluid or condensed milk on a large round smooth iron cylinder. This cylinder is heated by steam on the inside of this roll. Just before the roll reaches the point where the liquid milk is applied, a long steel knife or scraper removes the partially dried milk in the form of flakes or ribbons. The drying is finished in an ordinary casein drier. The dried particles are ground fine and bolted or sifted much as wheat flour is handled.

This powder is heated to a much greater temperature than is the powder produced by the spray process. The

result is that it takes longer to dissolve. It has more insoluble matter and a more pronounced cooked taste than the spray milk.

By far the greater percentage of milk powder today is spray powder. This product is in greater demand and commands a higher price than the roller process powder. This process requires more floor space than the rolls, and we will try to explain the way the milk is handled.

The raw skimmed milk is heated in the forewarmers or hotwells, usually to a temperature around 160° Fahrenheit. It is drawn from the hotwells into the vacuum pan and condensed from five to five and one-half into one. The condensed milk is generally cooled and stored in ordinary pasteurizing vats or ripeners. The size of all parts of the equipment should, of course, be made to coincide in capacity to the size of the balance of the equipment. From the ripeners the condensed milk goes to a heater, an ordinary milk heater such as used for a separator. From the heater it goes through the high pressure pump and through the spray nozzles into the drying chamber.

The high pressure pump is usually made with three brass cylinders, and in fact is very similar to the pump of the Viscolizer or Homogenizer.

The spray room can be built in most any size, provided the room is large enough to prevent the spray shooting across and hitting the opposite wall. Many of the newer dry rooms are built round, and in fact are made from wooden silos, insulated, and lined with tin plate. The joints in this tin plate are all locked and soldered. The insulation generally consists of Beaver Board and sheet asbestos.

The warm air inlet is in the bottom of these rooms and in the center. This air is supplied by a large fan or blower. In a room of a capacity of 600 pounds of powder per hour the air consumption is approximately 20,000 C. F. M. This air is heated by being passed through a large bank of steam coils. Where the air is washed the air washer is placed between the outside air connection and the fan. To summarize, the air is drawn from out-doors through the air washer into the fan, and passed around the steam coils and into the drying chamber.

The air is taken out of the room through large cloth covered screens. For best results there should be approximately 300 square feet of exhaust area for each square foot of inlet area.

The large exhaust area permits the moisture laden air to leave the room at very slow velocity, and the slower the air moves the less likelihood there is of any powder going with the air.

It is the same principle as the wind and the dust—if the wind blows it is dusty, and the dust increases with the velocity of the wind. And this is true in a milk drying chamber.

These drying chambers are from twenty to thirty feet high, depending upon the diameter. The sprays are near the top of the chamber, and the milk falls down through the ascending current of heated air. The dry powder lays in the bottom of the room.

During the drying process water is leaving the milk and the evaporation is actually cooling the milk. When the powder reaches the floor it is six feet below the air inlet—so that the powder never is as hot as the drying chamber. After the powder is dry it will stand considerable heat without affecting the quality of the powder.

The powder is removed from the room through a hopper in the bottom of the room. This hopper is large enough to hold a full days batch. A conveyor takes the powder from the bottom of the hopper and through the bolter. This bolter discharges directly, into the barrel and the barrel is usually set on scales so that exact weight is secured in each barrel without transferring powder from one barrel to another. The bolter is such as used for bolting corn meal.

Some milk powder is coarse grained and some is fine. Of course, the coarse powder will dissolve more readily than the fine, just as granulated sugar is more quickly dissolved than powdered sugar. The texture of the powder can be governed by the size of the spray nozzle and the pressure used in spraying. If the opening in the spray nozzle is small and the pump pressure high, the spray of milk is more finely broken up and the powder is fine. If the spray opening is enlarged and the pressure decreased the powder is coarser.

The powder is generally shipped in drums holding 200 pounds. The drums are first lined with a moisture-proof bag made from a special water-proof paper.

The keeping qualities of skimmed milk powder depend largely upon how dry it is. We have seen milk powder vary in moisture from one-half of one percent to ten percent. Milk powder for safe keeping should not exceed three and one-half percent. For immediate consumption it can be run with higher moisture, but for general oper-

ating practice it should be kept within the limits mentioned. If the moisture is too high the powder will cake or lump. Caked powder is the result of moisture. Either the moisture was high when it left the factory, or it was stored somewhere where it absorbed moisture from the air.

High moisture in manufacturing is generally caused by the exhaust screens not being properly cleaned and restricting the free flow of the moisture laden air from the room.

I cannot undertake here to tell you the cost of manufacturing milk powder. It depends upon the amount of powder produced, overhead charges, cost of fuel, and many other conditions.

The factory cost in some large plants runs about two and one-half cents per pound of powder.

We do not advise the building of small capacity powder plants.

The average yield in powdered milk is about $8\frac{1}{2}$ pounds per 100 pounds of skimmed milk, and about $12\frac{1}{2}$ pounds per 100 pounds of whole milk.

WEDNESDAY EVENING special meetings:

HOLSTEIN-FRIESIAN MEN MEET

A meeting of the Vermont Holstein-Friesian Association was called to order last evening at the Hotel Vermont roof garden by President O. L. Martin with a representative delegation present.

The following men were nominated as delegates to the national association, to be held at Kansas City in the spring; Dr. J. M. Allen, St. Johnsbury; F. B. Howe, Burlington; O. A. Thomas, Rutland; W. K. Farnsworth, Rutland; and F. M. Willey, Cambridge.

Prof. C. L. Blackman, field secretary of the New England Holstein-Friesian association, explained the contemplated New England sale to be held probably at Springfield, Mass., in May. There seemed to be a feeling that Vermont would raise its quota.

A general discussion of the State bovine tuberculosis policy followed. The investigating committee appointed by Gov. Hartness was present, asking many questions and listening with interest to the discussion of the members. They apparently felt the united desire on the part of the Holstein men to wish this policy carried out.

JERSEY CATTLE CLUB.

The annual meeting of the Vermont Jersey Cattle club was held at Hotel Van Ness last evening. The commission appointed by Governor Hartness to investigate the eradication of bovine tuberculosis was present and listened to a discussion of the subject, after which the organization voted to go on record as favoring the present method of eradicating bovine tuberculosis.

The following officers were elected to serve for the ensuing year: President, F. L. Davis, White River Junction; Vice President, O. A. Blaine, Barnet; treasurer, W. H. Harrington, North Pomfret; secretary, G. U. Tiffany, East Berkshire. The board of directors elected were as follows: E. H. Jones, Waitsfield; Charles Oliver, Woodstock; D. A. Blaine, Barnet and W. J. Fassett, Enosburg Falls.

GUERNSEY BREEDERS.

**ANNUAL MEETING AND BANQUET OF STATE ASSOCIATION—
WILL HAVE SALE IN JUNE.**

The annual meeting of the Vermont Guernsey Breeders' Association was held Wednesday evening at the Hotel Vermont with one of the largest attendances in its history. Breeders from Massachusetts and New York State were also there and the American Guernsey Cattle Club was represented by E. A. Onsrud, editor of the Journal. Among the many topics discussed was the next annual sale; this will be held at the farm of T. Redfield Phillips of Montpelier some time in June and will contain about 30 head. The officers of the association, elected for the ensuing year, were: President, T. Redfield Phillips of Montpelier; vice-president, J. P. Ramsey of Charlotte; secretary and treasurer, U. A. Woodbury, 2nd, of Burlington.

WEDNESDAY EVENING SESSION.

In the dining room of the Van Ness a large audience gathered and watched with interest moving pictures, showing the leading working animals in the various breeds, accompanied by an interesting lecture from Professor J. A. McLean. The program was given through the courtesy of the Quaker Oats Company. Following the pictures a quartet furnished by the Worcester Salt Company delighted the audience with several selections and community singing followed.

THURSDAY MORNING SESSION.

**INCREASING THE PRODUCTION OF OUR HERDS
THROUGH MORE INTELLIGENT FEEDING.**

BY C. L. BLACKMAN, FIELD SECRETARY.

**NEW ENGLAND STATES HOLSTEIN FRIESIAN
ASSOCIATION.**

*Mr. Chairman and Members of the Vermont State
Dairymens' Association, and Friends:*

Yesterday I discussed some of the principles which must be followed if the efficiency of the individual cow is to be increased through constructive breeding. Today I would like to discuss with you for a little while some of the outstanding principles with regard to the proper feeding of our Dairy cattle. It makes very little difference how good or how poor a cow is, if she is improperly fed it is impossible to receive from that cow the most economical production or in other words it is impossible to make an efficient machine of that animal.

Before discussing what we generally term "feeds," I want to mention some of the general requirements: In the first place if the cow is to live and produce as she should the conditions about her must be as nearly natural as possible and as the native habitat of the cow is in the free open country she is accustomed to a full and free supply of air, and air is just as much a food as the corn and cotton-seed meal we feed, and in some ways is more vital. A cow may go for days without feed but if you should cut off her wind for a few minutes she would be no more. So, it is essential to have proper ventilation and well-lighted barns in order that this free air may be supplied. Water is another very essential material also, and an important part of feeding and management. Water is just as much a food as any other materials furnished to livestock. In fact a cow can go a longer time without food than it can without water. Relative to watering I will say this, briefly; Any cow that is worthy of being in a Dairyman's stable should have plenty of water at least twice a day.

This water should not be given from a brook that is frozen, but should be furnished in a trough with the chill removed in winter. I never used to feel quite certain that the automatic drinking cup was essential to dairy management, but the more I observe the individual drinking cup, which will allow the cow to drink at any and all times, the more I believe this is a practical dairy equipment.

A cow may well be likened to a machine, into which a large amount of rough, coarse feeds are put, and from which a very concentrated, highly nutritious food, is removed. The Dairy cow is the most efficient animal producer of human food that we have, and she is so by virtue of the fact that she is able to turn the coarse feeds and roughages of our farms into Dairy products. In order to make the cow as efficient as possible it is necessary to make her produce to capacity, not to overcrowd her in such a way as to produce a few extra lbs. of milk at more cost than the milk is worth, but in such a way as to make her give the last lb. that she can give efficiently. It makes very little difference whether a cow is giving 20 lbs. of milk or 40 lbs. of milk a day. The amount of feed that is used is the same, therefore the cow that gives 40 lbs. a day is far more efficient than the cow giving 20 lbs. In order to make a cow consume the large amount of feed that is necessary, the feed which is given must be of a palatable character. I need not explain this, simply give the cow what she likes and hankers for, cloverhays and the legumes in general are far more palatable than the non-legumes such as timothy. Hay that is cut at the right time and made under desirable conditions is far more palatable than moldy hay or hay that has been shattered in the making. Certain of the grains are more palatable than others although some of the palatable feeds are very valuable.

In order to properly nourish the cow it is necessary that the feeds included in the ration come from a variety of sources. By variety I mean from different plants. It is necessary and well to have at least 4 or 5 different plants represented, for example, if a ration was made up of wheat bran, corn meal, ground oats, cottonseed meal, corn silage, and clover hay, there would be 5 different plants represented in the ration. A variety of this character tends to make the ration more palatable, but more important than this is the fact that in order to get full use of the protein ration it is necessary to have the protein come from several different sources. The reason for this is that the proteins of one plant are not the same as the

proteins of another, and these proteins which are fed must contain all of the constituents of which the animal protein is built up, and the animal proteins are built from 18 to 21 different constituents. In order that all of these constituents may be present (within) a number of feeds from a number of plants must be used.

As I have said before the success of the Dairy cow depends on her ability to turn the rough feeds of the farm into dairy products. The cow is only able to do this because of the enormous digestive tract which she has, and because she has this peculiar kind of digestive tract, we must meet the requirements of this system in order to achieve success. It is often said that a cow has four stomachs. This is practically true, but the real fact is that the cow has one stomach with four compartments. The total capacity is equal to about 50 gallons. If you have noticed a cow in a pasture, you will recall she eats very rapidly and chews her food but little, and this is exactly the case. When the food first enters the digestive tract, it passes on to the first stomach or rumin, and here it is broken down by the salivary juices. When the cow lies down she regurgitates this food about 4 ounces at a time, and chews it up again or as we say she "chews her cud." Then the food goes to the third stomach where it is subjected to a rubbing and drying process, and then passes to the true digestive stomach which is like that of yours and mine, and here the food is treated by the digestive juices of the stomach. I neglected to mention that the second stomach is a space closely associated with the first stomach which contains chiefly the watery material and acts as a catch-basin for the foreign materials that the cow picks up. Because the cow has this enormous digestive tract it is necessary that she receive bulky foods. Of course the hay and roughages are sufficiently coarse in themselves to be readily digested but certain of the grains are too concentrated and heavy to be readily handled by the cow, and when such grains are used it is necessary to use them in association with other lighter grains. For example, it is well to have about $\frac{1}{2}$ of the grain ration made up of bran and ground oats, and other light grain feeds.

The natural feed of the cow is the green grasses of our pastures but in most places it is impossible for the Dairy cow to have green grasses the year round, and so the succulence should be furnished in another way. It may be furnished by silage and where silage may be grown it is one of the most desirable feeds on the farm, not because of the nutrients but because of its cooling laxative effect.

Roots are sometimes used to furnish succulence. Where silage is not available dried beet pulp may be used and soaked up with water. Four or five pounds of dry beet pulp will soak up twenty or twenty-five lbs. of water. In cases where none of these succulent feeds can be obtained it is highly desirable to make a part of the grain ration of oil meal for this has the cooling laxative effect desired. If this is not used and no succulent feeds are used constipation and other digestive disorders are likely to follow.

Another very important consideration is the balance of nutrients or the relation of the carbohydrates and fat constituents to the protein constituents. The ordinary dry cow will need about 1 pound of protein to about 10 lbs. of carbohydrate, equivalent i. e. carbohydrates $2\frac{1}{4}$ times the fat present. However, the highly producing cow requires far more protein than this, due to the fact that the milk contains a large amount of protein, which protein comes from the feed that the cow consumes. Therefore the high producing cow needs 1 lb. of protein to 5 to 7 lbs. of carbohydrates. In order to furnish a balanced ration to the animal as cheaply as possible it is necessary to produce as large an amount of legume hay as possible, for the legume hays contain from 3 to 4 times as much protein as do the non-legume hays, and the protein that is not furnished by the hay must be furnished by the grain, and it is the protein portion of the grain ration which generally costs the most.

It so happens that carbohydrates cannot build tissues or furnish energy, and hence we cannot make up the lack of proteins by the addition of more carbohydrates. For example if we were furnishing a cow sufficient protein to maintain her body and produce 25 lbs. a day and at the same time giving her sufficient carbohydrate to supply the energy to her body and produce 40 lbs. a day the production would stop where the protein stopped as the carbohydrates cannot do the work of the proteins.

A great many feeders of dairy cattle do not make sufficient allowances for the individual animal. Oftentimes the entire herd will be fed the same ration where it is probable that many animals will be fed too much and others too little. If the feed was properly apportioned the total production would probably be increased without any increase in the total amount of grain used in the entire herd. I have seen a whole line of cows fed 8 lbs. of grain a day. Now some of these cows were nearly dry, others giving 40 lbs. of milk. Some of these cows should

have received 5 lbs. of grain while others should have received 12 or 13 lbs. Cows should be fed according to their ability to produce. A good guiding rule is: Feed one lb. of hay for each 100 lbs. of liveweight and feed 3 lbs. of silage to each 100 lbs. of live weight, and feed 1 lb. of grain for every 3 to 4 lbs. of milk produced. This is not an absolute rule but should be used as a guide. In case silage is not fed of course more hay will have to be given. A grain ration which at present prices would be a desirable ration is the following: for a cow weighing 1,000 lbs. and producing 30 lbs. of 4% milk, 10 lbs. of mixed hay, 30 lbs. of silage, and 10 lbs. of a ration composed of 200 lbs. bran, 200 lbs. of corn meal, 100 lbs. of cotton seed meal and 50 lbs. of oil meal. Another grain ration would be: 200 lbs. bran, 100 lbs. corn meal, 100 lbs. cotton seed meal, 100 lbs. distiller's grain and 50 lbs. of oil meal. Always in making up rations an endeavor should be made so far as possible to get the most nutrients for the least amount of money. This does not mean to buy the cheapest feed but it means buy feeds with consideration to the nutrients present. In fact it is generally more economical to purchase feeds of good quality than to purchase feeds of poor quality, for example, the high protein cottonseed meal is generally more economical to purchase though it costs more per ton than a low protein cotton seed meal. The cow-testing associations have furnished many valuable examples of how feeding of well balanced rations has increased the profits of our Dairy herds. One of the most interesting examples of that, that has come to my attention, was the herd of John Gerahty and Sons, of MacGregor, Iowa. This herd was owned by an old gentleman and was run by him in co-operation with his four sons. These men had a very good herd and when the cow-testing association was organized they were interested enough to join. They did not have much confidence in scientific feeding however, but through the efforts of the tester finally tried some of the rations which he suggested. These trials gave sufficient favorable results that the following year the directions of the tester were followed more completely.

The following is a summary of the production of one herd of 10 cows tested for 2 consecutive years. This shows how the average production was increased from 5,968 lbs. of milk, and 304 lbs. of butterfat, to 7,850 lbs. of milk, and 417 lbs. of butterfat, making an increase of 1,882 lbs. of milk and 113 lbs. of butterfat. The increased cost of feed per cow during the 2nd year was \$31.18, and the increased value of production from each cow was \$88.86 on the

average. Thus by balancing the ration and feeding more liberally according to production an increased feed cost of \$31.18 per cow gave an increase in production of \$88.86. This shows the value of feeding a balanced ration and feeding according to production.

NEW ENGLAND DAIRY AND FOOD COUNCIL.

PROF. W. P. B. LOCKWOOD, BOSTON.

Members of the Vermont Dairymen's Association:—

Last year I came before you to interest you in the milk educational and advertising work and to secure your support. This year I am coming back to report to you what we have accomplished and also to ask you for more full and hearty support.

The dealers have contributed to this work \$17,345 and the producers \$6,903. You will see that the dealers have put in about \$3.00 to the producers \$1.00. This has been largely due to the refusal of one company last year to take out any money from the producers and the difficulty we have had in getting producers to sign authorizations for another company. Each one of you could help on this by insisting that the people who buy your milk come in on this project. Now I will tell you what we have done.

The Massachusetts Agricultural College was so impressed with the possibilities of the Milk Educational and Advertising work started by the Boston Milk Campaign that they allowed the writer leave of absence from teaching work in order to organize milk educational work. They provided funds to hold the work together until the dealers agreed to furnish money on the basis of contracts at the rate of $\frac{1}{2}c$ per 100 lbs. of milk for milk purchased and $\frac{1}{2}c$ per 100 lbs. of milk for milk sold, to be provided by the producers.

It was February before the last contract was signed. Part started on November milk, the balance coming in as more contracts were signed. All however, were dated not later than for January milk. Little money was received until March, from which time work started in earnest.

The aim of the Council has been to distribute the work throughout Metropolitan Boston so as to reach the territory covered by the delivery of all contributors. This has not been easy at all times as it has been difficult to get proper contracts in some districts. On the other hand, we have had some calls from outside districts.

The work was started with a paid Secretary or Manager, one trained worker and a clerk, and it has developed

until at present we have, in addition to the above, three trained women workers, one Italian worker, and an office helper, making a total of eight. We have on some occasions employed an extra worker.

The activities of the council have been confined to work with the schools, welfare and other organizations, exhibitions, preparation and distribution of milk literature and printed matter. We have furnished costumes for milk plays, the Milk Fairy Film, and we have used mechanical exhibits wherever possible.

The interest in the Health Program for school children, and the part that milk plays in the food side of this program, has opened for us one of the largest opportunities to be of service and at the same time to help our industry.

The undernourishment and malnutrition of school children has led to much interest by teachers, school and health authorities and parents. It is usually found that underweight comes from a faulty diet caused by a poor selection of foods. Milk is the essential food to help overcome this trouble and promote growth of both body and the mind of the child.

Our workers, through lantern slide and chart stories, and talks to children, help with the health program, stressing the proper selection of foods and emphasizing the use of milk. These talks have started many children drinking milk, who had not taken it before; they also stimulate milk drinking where interest is lagging.

We have been working in all grades of the public, parochial, and private schools, as well as the continuation schools, evening schools, one normal school, and one college. In this work we have given 1,054 talks in 321 schools.

The workers have made a study of the methods of serving milk in the different schools and are often called to help to plan and start the service in schools that are starting to serve milk.

Professor Hosie, Editor of the Columbia Teachers' College Magazine "Teaching Methods," was so impressed with the presentation of our work that he asked us for a three thousand word article with illustrations for this magazine. We furnished this and expect it will appear in the January or February issue.

Illustrated lectures relative to the proper selection of foods, their effects, etc. have also been prepared for adult groups. The following given this year, gives some idea of the diversity of the calls and the type of people reached:—

ORGANIZATIONS.	No.
College or Normal School class or conference.....	5
Clubs	6
Church Associations or Schools	5
Dairymen's Associations	2
Dealers' Meetings	2
Drivers' Meetings	7
Fairs & Exhibits	2
Food Clinics & Health Centers.....	3
Girl Scouts	1
Grange	4
Home Groups	3
Mothers Clubs	22
Museums & Libraries	5
Parent-Teachers Assoc.	8
School Principals Meetings	2
Settlement or Neighborhood Houses	10
Stores, factories, industrial centres	48
Street Corners	2
Y. W. C. A.—Y. M. C. A.	4

A total of 141 of these talks were given. With these two types of lectures or talks, our workers reached 106,002 children and 8,604 adults.

A survey of Boston and suburban Boston taken in November showed over 417 schools were serving milk to over 45,000 children. On the basis of the amount sold in schools, the total for the school year would be approximately one and one half million quarts. Several dealers have told us that they find their sales are increasing in the districts where milk is served in the schools.

We have purchased large quantities of printed matter, posters, etc. from the National Dairy Council. In addition to this, we have developed and printed leaflets, weight tags, posters, etc.

We have distributed from the office 212,467 pieces; sold to other than dealers 25,662 pieces; sold to dealers for their own distribution 77,846 pieces; distributed at exhibitions, fairs, etc. 71,599 pieces; distributed 8,678 posters and 1,374 milk games, making a total of 397,717 pieces.

Our monthly school mailing list at present is 24,500.

The mechanical cow exhibit has been very popular in schools, stores, etc. Two cities have taken this and exhibited it in all schools, the cities transporting it. It would be hard to tell the number of people who have seen them.

Seven mechanical cow exhibits and four mechanical milk bottles have been sold. One bottle went to the Argentine Republic.

The mechanical cows have been exhibited a total of 80 six-day weeks and one day. The mechanical bottles have been exhibited a total of 82 six-day weeks and four days.

We have had exhibits at the Massachusetts Agricultural Show, Child Health Week, Home Beautiful Exposition, Waltham Fair, Eastern States Exposition, and at numerous church and other fairs. In addition to this, the mechanical exhibits have been used in every New England state, particularly in connection with health weeks or exhibitions.

We furnish costumes for the Milk Fairy Play and the Quest For Health Play. These plays have been staged by school children twenty-five times with a total of 6,000 people seeing them. The Quest for Health Play (written by our Miss Dallinger) we understand will be used on seventy playgrounds in and around Boston this coming summer.

On account of lack of funds we have not developed one of the best fields—the moving pictures. We are using one film, the Milk Fairy Play, which over 7,000 people have seen.

The newspaper advertising was handled by the Boston & Suburban Milk Dealers' Association, so that our advertising has been limited to teachers' papers and programs that came in direct contact with mothers or children.

In addition to the contract contributions, the New England Milk Producers' Association gave us 5000 "What Milk Will Do For Your Child" pamphlets, value \$100.00.

The Massachusetts State Dairymen's Association gave us a mechanical milk bottle costing \$125.00.

The Massachusetts Society for the Promotion of Agriculture gave us a mechanical cow exhibit costing \$280.00.

We wish to acknowledge the splendid co-operation we have received from the following:—

Massachusetts State Board of Health
Massachusetts State Board of Agriculture
Massachusetts Agricultural College
Boston Dietetic Bureau
Boston Dispensary
Boston Board of Health
Federated Jewish Charities
School Departments—Public, Private & Parochial

Out-Patient Departments of Hospitals
Settlement Houses
Assoc. for Promotion & Protection of Savings
Congregational House
Welfare Stations
Anti-Tuberculosis Association
Metropolitan Chapter, American Red Cross

We also wish to acknowledge the co-operation of the following organizations who have placed the Council on their list for speakers and material:

Massachusetts Parent-Teachers Association
Massachusetts State Federation of Women's Clubs
Mother and Child, American Child Health Assoc.
Church Militant, Paper of Episcopal Church
Massachusetts State Department of Health
Boston Dietetic Bureau

There have been over 250 telephone and personal calls for speakers or material. These aside from the many letters received about both.

People are finding out what we have and what we are doing, so that these calls are becoming more frequent.

Contracts have been signed by thirty dealers in Worcester and \$635.65 has been collected. Some work has been done. Providence dealers have signed contracts and \$183.05 has been collected. We expect to start work there in a short time.

From this year's work, it looks as though more attention will be needed in stimulation or reselling the health and milk program to children in the schools.

As industries start again we want to do more work with them. There is a chance for window display work and use of more movie films. These will be taken up as fast as funds permit.

We believe that the "surface has just been scratched" as to the possibilities of milk educational and advertising work that can be done profitably. We have the foundation work done; we have the organization started; we now need more funds.

BOVINE ABORTION.

J. T. DEVINE, GOSHEN, N. Y.
PROFESSOR OF CATTLE PATHOLOGY AND OBSTETRICS,
N. Y. VETERINARY COLLEGE, NEW YORK, N. Y.

Abortion is not a venereal disease.

The information gathered by the various workers on abortion disease is bringing about a solution of many phases of the problem that is of importance to practitioners.

For instance, it has been thought by some and accepted by many that abortion disease is a venereal disease and that its transmission was through the genital tract and that its spread depended almost wholly upon sexual intercourse, similar to the transmission of venereal diseases of the human family.

It now seems conclusively proven that such is not the case, but rather that it is a disease of the maternal uterus and fetal membranes, and that its introduction occurs largely, if not solely, through the digestive tract.

Further information indicates very positively that the disease, in a large number of cases, is due to the Bang organism, and that this organism lives and multiplies in the female body but in two places—

1st: In the pregnant uterus, disappearing from this organ very shortly after parturition or abortion, usually from within two to three weeks and probably always before the elapse of two months.

2nd: The other place in which the organism lives is the udder of infected cows, remaining here in some cases for years. But apparently it does not produce any pathological condition in the udder.

Some cases of abortion are, undoubtedly, due to causes other than Bang organism. Some workers, notably Smith, have found in a few cases that abortion was due to a *Vibrio*, and in one case, at least, to a mould.

The Bull as a Factor:

Here again the general belief of the past must be changed, based upon what now certainly seems conclusive evidence:

1st: That the bull may be infected with the Bang organism.

2nd: That his genital organs may become so seriously diseased from invasion of the Bang organism as to render the bull weakly potent or sterile.

3rd: A bull so diseased is believed to be incapable of transmitting the disease through the genital canal.

The discharges from such an animal may infect surroundings, food, litter, etc., and in that way be a source of infection.

The point is that the bull may be infected but if kept isolated and bred to cows on neutral ground only, so as not to infect the cows' habitat by his discharges, that such an animal will not transmit abortion disease.

The experiments of the U. S. Bureau of Animal Industry, Experiment Station, in its efforts to infect cows by injecting great quantities of the Bang virus into the prepuce of the bull and the vagina and uterus of the cows at the time of breeding without being able to produce the disease, are extremely interesting, and we recommend this report to all veterinarians interested in this problem.

The Bang organism produces in the pregnant cow an inflammation of the chorion (external coat of the fetal membranes) and the maternal cotyledons. This very often leads to death and the expulsion of a premature fetus, or if the fetus is carried either to full term or for a period of about five months or more, a retention of the placenta. The disasters occasioned by the retention of the placenta are well known to veterinary practitioners.

The diseased membranes offer a fertile field for the development of other organisms, principally *Streptococci*, *Bacillus pyogenes*, and *B. proteus*.

The Bang organism has been found to persist alive in the material in which it is discharged outside the bovine animal for many weeks.

Diagnosis.

The diagnosis of bovine infectious abortion is possible through a study of the history and condition of the herd and by means of the serum tests, (agglutination and complement fixation) and bacteriological studies of fresh infected material.

Agglutination and complement fixation tests are accurate and correspond to the bacteriology, that is when an animal does not react to *B. abortus* antigen, but still aborts, there is the probability of that particular case being caused by some other agent.

Methods of Controlling Abortion.

Abortion can be controlled or reduced to a minimum by—

1st: Sanitation, thorough and persistent cleaning and disinfecting in the stable every day or two for perhaps a year or more. This, of course, is to rid the premises of the infection.

2nd: Strict isolation, as is practicable, of aborters or those that hold their after-birth.

3rd: Immunization of virgin heifers and non-pregnant cows with Abortion Vaccine (live culture) two months or more before breeding. It apparently takes about two months to establish immunity.

4th: Treating of all cows already pregnant with the Abortion Mixed Bacterins every ten days during pregnancy.

5th: Isolating every animal that aborts or that holds her afterbirth, having her uterus thoroughly douched every day, beginning 24 hours after parturition, by a capable veterinarian, until the uterus is clean, and then have some one continue douching the cervix and vagina with a very warm solutin containing a good douching powder. Use a pump and tube to douch with so as to reach every nook and crevice. Continue douching as often and as long as the supervising veterinarian thinks it necessary. We recommend douching of the uterus with plain boiled water or a mild alkaline solution, when the placenta is retained, while the uterus is still strong. Such douching will positively keep down putrifaction of the membranes and so lessen pathological changes of the uterus. But we cannot caution too forcibly against douching or attempting any severe manipulations of a uterus that has been neglected until the membranes have decayed and the walls of the uterus severely infected. Such a uterus is easily ruptured, allowing infection to escape directly into the peritoneal cavity. In these cases we recommend internal medication, and Metritis Bacterins; removing from the uterus, with greatest care, any loose debris, and the use of Uterine Capsules. In some cases where the cervix contracts too rapidly, it is well to pack it with gauze or cotton that has been dipped in a ten per cent. solution of Tincture of Iodine. This, of course, is to be removed and the uterus allowed to drain every day or two.

6th: Burn or bury with lime such material as aborted fetuses, placenta, etc.

7th: Begin the very day the cow aborts or the day she calves and holds her placenta to give a hypodermic injection of Metritis Mixed Bacterin (Bovine) and continue every 3 to 5 days, as long as there is any evidence of infection in the uterus. Acute puerperal septicemic cases should receive Metritis Mixed Bacteria daily until the temperature drops and the acute symptoms subside. Mixed Metritis Bacterins have given us, in some cases of Metritis and Metro-Peritonitis, results little short of phenomenal. Consequently, we feel that we cannot recommend them too strongly to our colleagues.

Duration of Immunity.

Experiment evidence indicates that vaccination by the live culture will immunize for a long period, perhaps several years. However, those familiar with the laws of immunology know that immunization against communicable disease is not always certain in every case. Therefore, it is suggested, where infection is prevalent in valuable herds, that vaccination be repeated the second year.

A cow that has aborted should be vaccinated before being bred again.

All new females introduced in a herd should be vaccinated before being bred.

The cause of abortion in cattle and mares is not the same. The latter being due, probably, to a para-typhoid organism. Infectious abortion in mares is readily and promptly controlled by bacterin treatment.

Abortion in cattle and swine is said to be related, based on evidence cited by Smith, Goode and Conway. It is believed that it is frequently transmitted from cattle to swine due to the hogs' habit of following cattle and eating the feces.

THURSDAY AFTERNOON SESSION.

EFFICIENCY IN MANUFACTURING AND MARKETING.

PROF. A. W. RUDNICK, IOWA STATE COLLEGE.

In the cooperative and small creameries the success or failure of the creamery in most cases is due to the butter maker. He can take fine raw material and make high grade goods, and be very efficient in the operation of his plant. On the other hand there are creameries which haggle about a few dollars in wages and thus hire an incompetent man. Cases have come to our attention where creameries have saved fifty dollars a month on wages and lost several hundred dollars a month thru poor butter and waste. Again there are creamery boards who try to save on equipment and lose many dollars as a result. We are working with a creamery at the present time which has underpaid the neighboring creameries 10 to 15 cents per pound butter fat and are paying a buttermaker one hundred dollars a month. The right type of man will not consider a creamery handling such a volume of business for less than two hundred dollars per month, and he could save that creamery his years salary every month. Skilled buttermakers are a necessity in the creamery.

The equipment must be of the right type. A careful study should be made to see what type of machinery is most suitable for certain types of work, whether it be pasteurizing, churning or any other process. For instance in carrying starters it has been found that 70-72°F is the temperature at which we get the most desirable aroma and flavor. In order to maintain this temperature in the mother starter a number of our creameries are having boxes built with four inches of cork insulation. Such boxes will cost about \$15.00 but are a very good investment. In one of our best creamery districts it was found that much of the butter scored 91 and 92 when the quality of raw material justified a 93 and 94 score. The whole trouble was the starter, after this had been remedied the butter score was improved. There is no reason why a creamery should have to buy a new starter once a week or once a month. With care in transferring a starter should be carried for

years. In our creameries operated by steam engines it has been found that much of the fuel consumption can be reduced by using a hot water heater where the exhaust steam is used to heat the water used for feeding the boiler and washing about the creamery.

It is very interesting to watch the prices paid for butter fat by the various creameries. Some of the inefficiently operated creameries making only a fair grade of butter are able to pay up with efficiently operated creameries making fancy butter. This used to be discouraging, but now every farmer knows that an average over-run in a whole milk creamery above 21% is suspicious or where gathered cream is churned an over-run over 23% needs careful scrutiny.

Waste in separating and churning must be guarded against. Very frequently we find creameries have low over-runs due to separators not skimming properly, either low in speed or the temperature of the milk not high enough before it enters the separator. In churning we frequently find that temperatures are not controlled as carefully as they should be and there is an excessive loss of fat in the buttermilk.

A buttermaker may save if he understands the control of the composition of butter. As an example the law requires 80% fat and less than 16% moisture. The government will not prosecute if the butter contains 79% fat. Now then if a buttermaker puts out butter with 82% fat he is losing 2%. Two percent on a run of 100,000 pounds is 2,000 pounds of butter fat at 40c is \$800. On the other hand if he does not understand control of composition he will sooner or later be picked up by the revenue department for high moisture and this is a very expensive lesson. A buttermaker who is really trying will not take butter out of the churn until he knows what the moisture content is.

In the packing of butter there is another chance for waste. Each package of butter should be weighed so as to know just what the contents are. When packing salted butter we usually find eight ounces per 63 pound tub enough to take care of shrinkage. In salted butter about 6 ounces.

In case the butter is printed care should be taken to weigh each print to see that it is neither overweight nor underweight. When printing butter many of our plants are weighing each pound adding to or taking from as the case may be to make each print exactly the right weight. While assisting in creameries prints have been

found to weigh an ounce over. On a thousand prints this would mean 1000 ounces or 62 pounds. Even $\frac{1}{4}$ ounce then means 15 pounds or about six dollars per thousand pounds. Good scales and careful weighing pays well.

Butter should be put up in attractive packages no matter whether in pound prints or in tubs. Some creameries attempt to save by using second hand tubs but this is very expensive because many a sale is lost because of the appearance of the tubs. When putting butter in prints a trade mark should be established and used. Stock cartons are of no advertising value and should not be used.

The marketing problem is one that is receiving very much attention. We are trying to improve our market by the use of a State Trade Mark. It is absolutely essential that we must have a high quality product before we get anywhere on an improved market. Most of the Iowa butter is sold on the New York market. Whether we can improve the present system on that market is problematic. That, however, is not giving us a great deal of concern. Our special markets at home are the ones with which we are concerned and in which we expect to place our trade mark butter.

The state of Iowa has adopted a trade mark for butter for the purpose of insuring a higher standard of excellence and quality, and to insure a more healthful product for consumption at home and abroad. The purpose of the law is to promote educational work which will assist the Iowa buttermakers in producing the butter to be marketed under the state trade mark thereby securing a more uniform butter market and a higher market value for the butter manufactured in the state.

The trade mark and its use and regulations are in charge of and under the control of an Executive Committee of five members consisting of the President of the Iowa Buttermakers' Association, the Dean of the division of Agriculture of the Iowa State College, the Professor of Dairying of the Iowa State College, the President of the Iowa Dairy Association and the Dairy and Food Commissioner of the State of Iowa.

The Executive committee has absolute control of the regulation, use and manufacture of the trade mark and is empowered to make changes in rules and regulations as it deems necessary. Labels, stamps or our other means of imprinting the trade mark on the butter or packages must be furnished by the Dairy and Food Commissioner.

The rules governing the use are as follows:

1. Butter sold under the trade-mark shall be manufactured in a creamery which meets the requirements of the Iowa Sanitary Law. Such creameries shall obtain a score of 85 or above, 100 being perfect, scored in accordance with the Iowa State Score Card for creameries.

2. The butter shall obtain a score on the quality of not less than 93 points, 100 being perfect, on 75% or more of the scoring. A creamery obtaining a score on butter below 92, or a creamery that has more than 25% of its scoring below 93, shall forfeit its right to use such trade-mark until such time as the creamery is again in a position to meet the necessary requirements.

3. All butter marked with the Iowa State mark shall comply with the Iowa State standards and contain not less than 80% of butter fat, and shall contain less than 16% of moisture. No preservative, neutralizer or adulterant shall be added to butter or the cream from which the butter is to be manufactured.

4. Butter sold under said mark shall be manufactured from cream, which has been pasteurized, either in the form of milk or cream.

Pasteurization shall consist in heating the milk or the cream to a temperature of not less than 140 degrees F. and holding it above 140 degrees F. for a period of not less than 20 minutes, or heating the milk or cream to a temperature of not less than 180 degrees F. when flash heat is applied.

5. If the butter is solid packed in tubs, the tubs shall bear the Iowa State mark on two opposite sides, the marks shall be placed immediately below the upper hoop or hoops, said mark to be three inches in diameter. In addition to the markings as stated the top surface of the butter shall bear an imprint of the said mark, this imprint to be five inches in diameter and the imprint into the butter shall be from one-sixteenth to one-eighth of an inch in depth. Butter in boxes either solid packed or imprint, shall bear similar markings on both ends of the boxes as those placed on the outside of tubs. A similar imprint shall be made into the butter solid packed.

6. The date of manufacture of the butter shall be marked on the outside of the tub or box close to the state mark, in letters not less than one-half an inch in height, the same being placed in the following manner: $\frac{12-5}{6}$. The figure 12 designates the number of the month, the figure 6 designates the day of the month, and the figure 5 designates the number of the churning on that day. Thus for

the above markings the reading would be that the butter was manufactured on the twelfth month, sixth day and was the product of the fifth churning.

7. Parchments for print butter may be marked with the state trade-mark. The size of such marking shall be two inches in diameter. At this time the board does not require the marking of the date on individual prints.

8. Application, in writing, shall be made to the State Dairy and Food Commissioner, who after having satisfied himself that the manufacturer is qualified to comply with all the requirements will issue a permit to use the State mark and also furnish copies of the mark and necessary equipment to the applicant. No other stamp or markings shall be used unless the same shall meet with the approval of the State Dairy and Food Commissioner.

9. Any creamery obtaining the privilege of using the Iowa State mark shall immediately upon request from the executive committee, send packages of butter for the purpose of scoring, to such places and in such quantities as may be designated by the executive committee. This butter shall be taken from the most recent churning made at the creamery. The butter after scoring will be disposed of, as nearly as possible, in accordance with the instructions furnished by the creamery.

10. The State Dairy Law makes it illegal for any person, firm, corporation, association or individual to use the said trade-mark for butter on their products without first complying with all the rules and regulations prescribed by the said executive committee for the use of the same.

11. Any person violating any of the provisions above shall be guilty of a misdemeanor, and upon conviction therefor shall be punished by a fine not less than twenty-five nor more than one hundred dollars or by imprisonment for not less than thirty days in the county jail. (Dairy laws of the State of Iowa, section 2515-g.)

When a creamery desires the trade mark, butter of the regular make of each churning must be sent to the State College, usually five pound containers are used. The butter is scored and when satisfactory results are obtained that is, enough churnings of proper standard have been made the Professor of Dairying recommends that the creamery be allowed to use the trade mark. The factory is scored and if it scores 85 or above the creamery is given the trade mark.

At intervals a surprise call is sent out to the creameries by special delivery letter or wire requesting that a

package of the butter on hand be sent on receipt of the message. One creamery was three years in meeting the requirements. They feel however they are well repaid.

This creamery has gone into one of the largest cities in Iowa and worked into that market with a higher class of butter than that city has ever known and are receiving five to ten cents per pound more for their butter than any other. Their method of opening and holding the market is worthy of study. In the first place they had a few individual customers who tried the butter and recommended it to others. The manager of the creamery felt that the market was a good paying proposition and that it could be enlarged. A number of women were hired as demonstrators. These women went from house to house with small samples of 94 score butter and had the lady of the house try it. An order blank was made out requesting the groceryman with whom the lady traded, to deliver a pound of Hull Creamery butter. These orders were then distributed and a salesman went to the groceries and sold the required butter to fill the orders. These sales were followed up at the groceries and other markets. About 25% were dropped because the butter was too high priced and then 25% because their credit was not good. The other 50% are all handling this butter although it is higher priced than any other butter. Space is used in the newspaper. One advertisement carried no creamery name, merely called attention to the fact that "Iowa Trade Mark Butter" was the only butter, the quality of which was guaranteed by the state of Iowa. A request was made to write the Dairy and Food Commissioner or the Iowa State College regarding this butter. Many letters were received as to what kind of a crank was trying to put something over on the public. Now this creamery carries space in the daily papers and in the moving picture shows. The moving picture advertisements always state that no neutralizer can be used in the manufacture of the butter. The prints carry this information as well. It is quite a talking point when it comes to making sales. The State Brand gives the additional value in that the public realizes that the quality of all butter is not guaranteed by the state and that it is exceptional.

A conference is called for next month by the secretaries and buttermakers of the state brand creameries in order to work out an advertising and sales campaign. We are looking for good results. The work has been hindered by the war and prosperous times, as was stated our producers were too prosperous and additional values when it

required extra effort received little or no attention. If in New York and Philadelphia special brands can command more than 10 cents per pound over unbranded butter we are certain that if these state brand creameries will work together they can do the same on the market in our state.

We have made some progress in the open market with the state brand. Very frequently butter buyers request addresses of State Brand Creameries. But in order to establish a market a creamery must keep at it. A creamery is making no progress when it jumps from one product to another from one outlet to another. We have creameries jumping from butter to sweet cream and back again, following the lines of least resistance. At the end of the year they are no better off than they were the previous year. A special market for special brands is real progress and profitable. The public must be taught not only to eat butter but certain brands of butter and Iowa is anxious that it be Iowa State Brand Butter or butter of equal quality. This will place the quality of American butter where it belongs.

THE DAIRY TARIFF.

PRESENTED BY O. M. CAMBURN, FOR THE NEW ENGLAND
TARIFF COMMITTEE.

The subject "The Dairy Tariff," assigned for discussion at this time, is of interest to the dairy farmers of the entire United States. The tariff rates on butter, cheese and condensed milk affect all producers of milk and in addition to these, the rates on milk and cream are of great importance to the New England dairy farmer.

In representing the New England dairy interests, your committee took the stand that the dairy farmer deserves a protection which is as effective as that applied to other industries, in order to encourage and maintain an intelligent class in the production of milk, this most essential product, and in the preservation of farms in a high state of fertility; that the United States producers of dairy products should be given protection equal to the difference in the cost of production between the United States and competing foreign countries.

The cost of production secured for the New England States and the Province of Quebec for the month of April show a difference at this time in favor of Quebec of 3½ cents per gallon for milk, 40 cents per gallon for cream, and 10 cents per pound for butter. It is confidently believed by the committee that the costs secured for this period are nearer together than in normal times, since the decline in the cost of labor and feed is taking place near the industrial centres more rapidly than in the outlying districts. It was also evident, from the household conveniences found in the Canadian province, that dairy farming has been more profitable there, due possibly to the more general engagement of the wives and daughters in the milking and other dairy operations in Quebec.

There has been a continuous decrease in the number of farms in operation and the number of cows in New England for 30 years. This is due to only one thing—unattractive returns, often actual losses. That livestock husbandry is necessary to the maintenance of fertility and to providing a market for roughage produced in New England is undisputed. On a general scale dairying offers the only solution to this problem.

For the past twenty years, the source of Boston's supply of milk and cream has been moving further away with the decreased receipts from nearby Massachusetts, Connecticut and southern New Hampshire. The next change, which is now taking place, is the tapping of Quebec, Canada for milk and cream. This is undesirable for the reason that (1) it results in large areas of farm land in New England, which should support dairy herds, growing up to brush and timber with their owners moving to cities for employment, (2) it results in the obtaining of absolutely essential food products from a foreign country where it is difficult to properly supervise the sanitary conditions of production.

From 1900 to 1920 population of New England increased from 5,600,000 to 7,400,000—an increase of 1-3, while during the same period the number of dairy cows decreased from 893,000 to 843,000, a decrease of 50,000 in 20 years. In 1910 there were 189,000 farms in New England while in 1920 only 156,000 are reported, a decrease of 17% in ten years. There is a like decrease in the acres of improved land.

During the period from 1900 to 1919 the production of butter in Canada increased from 36,000,000 pounds to 104,000,000 pounds, and from 1917 to 1919 the number of cows increased from 1,102,000 to 1,648,000, Quebec increasing from 546,000 to 565,000 and Ontario from 445,000 to 747,000.

Dairy products sold from New England farms in 1919 amounted to over \$94,000,000.00. Milk and cream need to be produced near the point of consumption because of their perishable nature and New England now produces sufficient of these dairy products to supply her needs without receipts from Canada. In 1919 when 416,000 gallons of cream were shipped from Canadian points to Boston, the butter produced in New England creameries would have provided 4,500,000 gallons of 36% cream or *eleven times the amount* necessary to replace the Canadian shipments.

The turning of the cream now used for butter to supplying sweet cream trade, cannot be accomplished in a few days when a cream dealer buying in Canada finds himself short. With a sufficient knowledge of increased market demands for sweet cream a New England producer now making sour cream or farm butter would prepare to care for his product better so as to supply sweet cream. The butter produced in New England would have supplied nine times the amount of cream needed to replace Canadian cream shipments to Boston for the month of heaviest ship-

ment (June). This butter would have provided a large amount of additional milk if more milk had been needed.

The importations of butter from Canada (U. S. Foreign and Domestic Commerce Report) increased from 351,000 pounds in 1913 to over 9,000,000 pounds in 1920, at the same time the "Reports of the Trade of Canada" (years ending March 31) report increases in the exports of milk from Canada to United States of from 8,000 gallons in 1913 to 1,300,000 gallons in 1921.

During the same period the imports of cream from Canada increased from 800,000 gallons in 1912 to 1,500,000 gallons in 1921. Of this importation of milk and cream, 94% of it came from the Provinces of Quebec and Ontario through the Vermont and St. Lawrence customs districts. Due to the cheaper production costs in Canada, the excellent markets in New England are being lost to the New England producer. This has resulted in a decrease in number of farms and cows and general lack of prosperity in the dairy sections of New England.

The cost of production of dairy products in the Province of Quebec is lower than it is in the New England States.

The cost of producing 1 gallon of 3.7 per cent milk is \$0.41 cheaper in the Province of Quebec, Canada, than in the New England States. Transportation charges to Boston favor the New England producers to the amount of \$0.0065 per gallon, which when subtracted from \$0.41 leaves the difference in favor of Quebec of \$0.345 per gallon.

Based on these costs, the cost of producing 1 gallon of 36 per cent cream is \$0.40 per gallon less in Quebec than in New England. Transportation charges to Boston are \$0.006 per gallon less from the New England center of production than from the Quebec center of production which when subtracted from \$0.40 leaves the difference in favor of Quebec of \$0.394 per gallon.

Based on the costs of milk, the cost of producing 1 pound of butter is 10 cents less in Quebec than in New England. Transportation to Boston of butter from center of production in New England is \$0.0003 per pound less than from the Quebec shipping point, which when subtracted from the 10 cents leaves the difference in favor of Quebec of \$0.0997 per pound.

From an administrative standpoint, and due to trade practices, a specific duty on milk, cream and butter is desirable.

Your committee contend that the raw materials—milk and cream—from which butter is manufactured should not enter the country at rates which are not equalized with the rate on butter.

One gallon of 4% milk (8.6 pounds) with a churn gain of 20% would make .41 pounds of butter. At 10c per pound on butter, the equivalent rate on 4% milk considering transportation charges, should be $3\frac{1}{2}$ cents per gallon.

The United States Tariff Commission states that "if it is desired to levy a duty on butter equivalent to that on the milk it represents, the duty on one pound of butter should be 2.76 times the duty on one gallon of milk."

With the duty on butter of 10c per pound as we propose, the duty on one gallon of milk to equalize with butter should be \$.10, divided by 2.76 or 3.6 cents per gallon.

One gallon of 40% cream (8.3 pounds) with a churn gain of 20% would make practically 4 pounds of butter. At 10 cents per pound on butter, the equivalent rate on one gallon, of 40% cream considering transportation costs would be 35 cents per gallon. Cream testing higher and lower per centums of butter fat, should carry corresponding rates.

The United States Tariff Commission states regarding equalization of cream and milk: "On the basis of physical equivalents, the duty on light cream would naturally be five to seven times that on milk, and on heavy whipping cream, about eight to ten times." At a rate of $3\frac{1}{2}$ cents per gallon on milk, the equivalent rate on heavy cream would be from 29 cents to 36 cents per gallon.

After paying the duties now carried in the bill (Par. 707 and 709) a Canadian creamery within 60 miles of the United States border could in September 1921 have made 21 cents per gallon more on shipping cream to the United States to be manufactured into butter here, than it could to manufacture the cream into butter in Canada and ship the same to the United States for sale. The two Provinces of Quebec and Ontario produce 70% of the butter manufactured in creameries in Canada and from 50% to 60% of the butter manufactured in these two Provinces is produced within 60 miles of the United States border.

The "New York Produce Review and American Creamery" published by Urner-Barry Co., New York, in its issue of July 6th, 1921, Page 562, has an editorial on "The New Tariff Bill" which among other things says, "One of the most apparent inconsistencies in this list is the relationship of duties on butter and cream. A gallon of $29\frac{1}{2}$ % cream weighs about 8.35 pounds and contains about 2.5 pounds of

butter-fat. Thus the butter fat in this cream would enter the United States on a basis of only 2c a pound duty while a pound of butter fat entering the country as butter would pay duty at the rate of 10% per pound. This discrepancy should encourage the growth of gathered cream creameries along our northern border and would possibly lead to some interesting experiments in the practicability of shipping high test frozen or refrigerated sweet cream to this country from abroad."

Relative costs of production of butter between the United States and Denmark indicate that the cost of producing butter in the United States was 35% higher than in Denmark in 1920, due primarily to cheaper labor costs in Denmark.

In 1897 when butter sold for 20 cents per pound, a duty of 6 cents per pound was imposed. At the present price level of from 40 cents to 50 cents per pound, a duty of at least 10 cents per pound would be required to give the same ad valorem protection.

In 1897 the cash wage of farm labor by the month with board in the New England states was from \$17 to \$18 while in 1921 the cash wage paid was from \$34 to \$36, more than double the wage in 1897. Other costs of farm operation have changed in like manner and at the new level of prices and costs, an increased specific duty on butter is required to give the same protection as was given in 1897.

For the reasons already outlined, we desire the following paragraphs to read:

"Par. 708. Whole milk, sweet or sour, 3½ cents per gallon; cream, sweet or sour, having not more than 20 per centum of butter-fat, 15 cents per gallon, for each additional 5 per centum or fraction thereof of butter-fat, 5 cents per gallon additional; skimmed milk, 1 cent per gallon; ice-cream mixtures, unfrozen, having not more than 15 per cent of butterfat, 15 cents per gallon, for each additional 5 per centum or fraction thereof of butter-fat, 5 cents per gallon addition; ice cream mixtures frozen, having not more than 15 per cent of butter-fat, 9 cents per gallon, for each additional 5 per cent of butter-fat 3 cents per gallon additional."

Par. 709. Butter, 10 cents per pound; oleomargine 10 cents per pound.

In conjunction with other dairy organizations in the United States who have or will present facts to support rates desired, we ask that paragraphs 708 and 710 be changed to read:

Par. 708. (To read) Milk, condensed or evaporated: In hermetically sealed containers, unsweetened, 1 cent per pound; sweetened $1\frac{1}{2}$ cents per pound; all other $1\frac{3}{8}$ cents per pound; whole milk powder $3\frac{1}{2}$ cents per pound; cream powder, 8 cents per pound; and skimmed milk powder, $1\frac{1}{2}$ cents per pound; malted milk and compounds of or substitutes for milk or cream, 20 per centum ad valorem."

"Par. 710. Cheese, valued at less than 30 cents per pound, 5 cents per pound; valued at 30 cents or more per pound, 25 per centum ad valorem; cheese substitutes, 5 cents per pound; lactarine or casein 5 cents per pound (this article now appears on the free list); all other dairy products not otherwise provided for, 20 per centum ad valorem."

The New England Dairy Tariff Committee represents the following farm organizations in New England: The Grange, the State Farm Bureau, the State Dairymen's Associations, the State Departments of Agriculture, the State Agricultural Colleges and the New England Milk Producers' Association. The personnel of the Committee is as follows: W. N. Cady, Vermont State Grange, Chairman; O. M. Camburn, Director of Dairying, Mass. Department of Agriculture, Secretary; J. W. Alsop, Connecticut Dairymen's Association; H. N. Sawyer, New Hampshire State Farm Bureau; M. D. Jones, Maine Agricultural College; G. R. Little, Eastern New York Milk Producers; J. J. Dunn, Rhode Island State Department of Agriculture; and W. H. Bronson, New England Milk Producers' Association.

This committee has endeavored to present your views for your protection and prosperity. They have done all that a committee can do. It now remains for you as a Dairymen's Organization, and individually to take such action as will keep your Senators and Congressmen informed that you need and believe in just rates on dairy products.

THE AGRICULTURAL ECONOMIC SITUATION.

HARRY P. YOUNG, FARM MANAGEMENT EXTENSION SERVICE.

Wars are the great disturbers of National Finances and of prices in general. A country at war must pay its bills. The easiest way is to start the printing presses going and print some money. Very simple but filled with danger and frequently with disaster.

Two very good examples of the disastrous effects of money inflation are our own Revolutionary War and the present Russian situation. During the Revolutionary War the printing presses ran until our dollar bills gave rise to the expression,—“Not worth a continental.” The sufferings of our soldiers at Valley Forge were entirely unnecessary. In a country with an abundance of food and materials for clothing American soldiers starved and froze. Why? The country had plenty of money but no money that would buy anything. Prominent men urged that the paper money be taken as an act of patriotism,—yet George Washington cautioned his farm overseer to take in rent only gold or silver money. After Alexander Hamilton put us on a sound financial basis these old dollars were redeemed in the new sound money at the rate of one cent for two dollars. Very few were presented for redemption, sportive saloon keepers and barbers had used them up for papering bar rooms and barber shops,—nice green dollars too. And yet some of us have been fools enough to buy German Marks.

Since 1791 three wars have been serious enough to upset our price system. Namely “the War of 1812 to 1814,” “The Civil War from 1861 to 1865,” and “The World War from 1914 to 1918.” The price disturbances have been very similar in each case.

The general price level has risen sharply during the wars, reached its highest point after the war closed, then gone down very rapidly for about a year causing a severe depression and then slowly dropped for a number of years until the pre-war level was reached.

In 1811 the general price level of all commodities was 160. At the close of the war of 1812 prices had gone up to 189, one year later to 235. Then in two years they

had dropped back to the pre-war level. Then for ten years they dropped more or less steadily till in 1824 they were at 108.

In 1861 the general price level was 93. By the close of the war it was at 176. One year later in 1865 at 200. Then prices dropped rapidly to about 150 and then went steadily lower till in 1878, fourteen years after the close of the Civil War they were back to the pre-war level of 93.

In August 1914 at the outbreak of the World War the general price level stood at 103. By November 1918 at the time of the Armistice prices stood at 211. People thought prices would go right down but in May 1920, eighteen months after the close of the war prices had gone on up to 276. Then prices went down. In twelve months prices had dropped to 153 and are still about there.

So far the price changes during and after the World War have been very similar to those changes during and after our other great wars. If prices continue to act the same we will have slowly falling prices for ten or fifteen years.

Things, however, may be entirely different.

Let us now consider what has happened to the prices of products Vermont farmers are most interested in.

Butter, eggs, meat, milk and most animal products lag behind in war time price changes. Food must be conserved and much formerly fed to animals is eaten by people. I presume we have not yet forgotten about wheat substitutes.

Having gone so far with the discussion of prices that have gone by where the evidence is in and we know what has happened, let us rush in where angels fear to tread and prophesy for the future. We will draw our conclusion from the past; but things may not go as they have in the past.

1. Judging from the past we may expect butter, milk, cheese and eggs to be on the average well above the level of prices in general for ten to fifteen years in spite of the fact that we are faced with a large surplus and the immediate prospect of a drop in milk prices in Boston and New York.

2. I expect farmers to be relatively prosperous in Vermont and this prosperity to be reflected in rising values for Vermont farm lands. Here again we may judge from

the past. After the Civil war the price of farms went up till along about 1870 when Uncle George went out to Iowa and took up a farm. Later about 1880 Uncle John went to Kansas and took up a farm there. Lately some of Uncle George's and Uncle John's boys have been writing back east inquiring about the possibilities of buying a farm in Vermont.

After the Civil War in 1870 according to the census figures Vermont farm property had gone up 40% over the prices in 1860. In 1920 Vermont farm land prices were 40% higher than they were in 1912. Now many people think farms will drop in price. They may but I hardly think so, for we have no great West to be settled now, as we had in 1870 to 1890.

RESOLUTIONS.

The Vermont Dairymen's Association at its fifty-second annual session thanks the Burlington Chamber of Commerce for its courtesies, the local press for excellent publicity, the hotels for reduced rates, and the University for the use of its plant.

We regret to learn in the morning paper of the serious illness of our esteemed Governor, the Honorable James Hartness, to whom we had hoped to listen at the evening banquet, and we sincerely trust that he may rapidly recover his usual health and be spared for many years to come.

We hail with delight many things, among them:

The Disarmament Conference, which seems to be bringing the nations together.

The enactment by the present Congress—and largely through the influence of the so-called agricultural bloc—of several pieces of constructive legislation in the interests of agriculture, and consequently, through agriculture, of the nation as a whole notably, aid to the Federal Land Banks, the War Finance Relief measure, the Packer control bill, the grain exchange control bill, and the farm to market road law,—these representing more agricultural legislation than has ever before been passed at a single session of Congress.

The establishment of a really worthwhile tuberculosis policy in Vermont by virtue of legislation passed at the last session of the General Assembly, whereby it is now possible to do reasonably effective work.

The formation of a creamery managers' and operatives' association, which, if wisely managed, ought to prove a potent factor in the upbuilding of Vermont's dairy interests.

The maturing of the State Federation of Farm Bureaus movement, which has now a local habitation and a permanent working force.

The rapid yet substantial forward movement of the several county farm bureaus.

The successful manner in which through the agency of the boys' and girls' club work literally thousands of boys and girls are becoming more vitally interested in and appreciative of life upon the farm.

The good work being done in the furtherance of bull associations and cow test associations the State over. And, finally, though the list is still incomplete, the evidences on every hand, that increasingly Vermont farmers are learning the meaning of the word "cooperation," and are evincing the fact by their deeds.

However, like *Oliver Twist*, we ask for more. While we realize that legislation is not a panacea for all our corporate ills, we believe that in several respects our interests and—since agriculture is a basic industry—the interests of State and Nation would be served by further legislation, more especially by the enactment of federal legislation looking towards:

Such tariff adjustments as will tend to equalize the cost of farm produce production in this and competing countries:

Such adjustment of taxation as will tend, so far as is practicable, toward the distribution rather than of the concentration of wealth:

Relief along credit lines:

The usage of warehouse receipts for commodity financing:

Such modification of laws as will clearly define the rights of farmers cooperatively to market their products:

The telling of the truth as to the fabric one buys:

The prohibition of the manufacture of or, if that be impracticable, the prohibition of interstate commerce in, or, if that is impracticable, at least the clear labelling of filled milk and the compulsory usage of a name which will obviously declare the thing, even to the casual reader, for what it is—this in the interests not only of the great dairy industry of the country but also of the health of little children.

Of course we are interested in the fight now being waged in behalf of New England dairymen by the officers or the New England Milk Producers' Association. May their decisions ever be wisely shaped and may their courage never fail.

We reiterate our last year's expression of faith in the worthwhileness of an advertising campaign in favor of the use of milk and milk products. We believe that the cow makes the very best home brew which can be made, that there is no kick in it—except as she kicks over the pail—and that, unlike the product of the still and the vat, her outpourings mean health and happiness for both producer and consumer.

Ernest Hitchcock was active in our councils for a

long time. He was six years a member of the State Board of Agriculture; for some time a cattle Commissioner; President of the Rutland County Farm Bureau; a Charter member of and for many years secretary and, later, president of the Vermont Forestry Association, and the first State Forester; and, withal, a good farmer, a good neighbor, a successful breeder of registered Holstein cattle. His given name befitted him. Earnest in all his work, he was a cogent thinker, a forceful speaker, a strong advocate, a constructive organizer, whose counsel we will miss.

J. H. HILLS,
JOHN CANDON,
W. C. BUSH.

Committee on Resolutions.

BUSINESS MEETING.

A motion was made and carried, recommending that a tariff of ten cents a pound on butter and kindred products be enacted, and that a copy of such resolution be forwarded to Vermont's senators and representatives at Washington.

A motion was made and carried that the Vermont Dairymen's Association combine with the State Grange in sending a delegate to represent both organizations at Washington in the Conference, arranged by Secretary of Agriculture Wallace, regarding the general situation of agriculture. Secretary O. L. Martin was selected as the delegate.

The election of officers resulted as follows :

PRESIDENT.....E. C. HILLIS, East Montpelier

FIRST VICE-PRESIDENT.....F. L. PARMALEE, Putney

SECOND VICE-PRESIDENT.....W. H. PORTER, St. Johnsbury

SECRETARY.....O. L. MARTIN, Plainfield

TREASURERW. H. HARRINGTON, North Pomfret

AUDITORF. L. DAVIS, Hartford

Adjournment.

BANQUET.

An hour before the banquet every ticket had been sold for seats at the tables in the Hotel Vermont dining room and the assemblage was one of the largest in the history of the time-honored custom of closing the annual meeting with a banquet. As the diners took their places skull caps were found for a head-dress, the thought of the Unicorn people, and the Worcester Salt friends supplied the depleted purses with near gold Good-Luck pieces. During the service of the dinner the Superintendent's quartet enlivened the occasion by rendering several musical selections, and community singing was greatly enjoyed.

Congressman Frank L. Greene was Toastmaster, and in his usual felicitous manner entertained, and introduced the post prandial speakers. At his suggestion, the host of diners arose and in silence bowed their heads for a moment in respect to His Excellency, Governor Hartness, who was ill with pneumonia. With his always present fund of stories and apt remarks the Toastmaster proceeded with the program of the evening. Telling of his trials with the customary flood of spring poetry when he was an editor, Mr. Greene said he was glad at last to introduce a real poet of Vermont, in Daniel L. Cady, who in turn declared that the influence of the dairymen's association and the sugarmakers' association had encircled the globe, so that, while he was in Rome, he had occasion to think of Vermont dairymen and sugarmakers and had written a poem there to be read on this occasion. The poem was entitled "A Vermont Herd of Cattle." Mr. Cady read two more of his poems "Dairying in Vermont," and "The Maple Tree", the former written in London, he said, and the latter in Florence, Italy, "with not a maple tree within 10,000 miles."

The next speaker introduced by the Toastmaster was Mrs. G. Sadie Smith Kinney, who has been connected with the dairymen's and sugarmakers' annual conventions for many years as official reporter. She related in interesting detail some of her experiences and observations in an agricultural way during a recent tropical trip through Cuba, the countries of Central America and Panama.

Dean J. L. Hills of the University of Vermont college of agriculture, was introduced as a man "whose record of 30 years of loyalty to this association has stamped his name upon it." The Dean spoke briefly of his long association with the two organizations, remarking that it was the 33rd annual meeting of the two associations which he had attended and the 31st which he had addressed. He said he hoped that his health and vitality and mental strength might be spared him for 30 years more, that he might then attend a like banquet and gathering of the two organizations represented and address the attendants on "60 Years of the Dairymen and Sugar Makers in Vermont."

Congressman Greene, in a few closing remarks, urged that the people of the Greene Mountain State live up to their heritage and not get too far away from the particular principles which are the foundation of Vermont's existence and which Vermont may well contribute to civilization today.

"Let us not forget how to govern ourselves," he said. "Let us remember that our State has a great future as well as a great past. We must live up to our past and not live upon it."

During the evening Congressman Greene presented to the three officers of the Women's Auxiliary, Mrs. Farnham of Montpelier, Mrs. Martin of Plainfield, and Mrs. Wright of St. Albans, also to the three speakers of the evening, autographed copies of "The American's Creed," written by William Tyler Page, a personal friend of the Toastmaster.

BUTTER SCORE, 1922.**DAIRY BUTTER.**

H. M. Lee, Windsor.....	95
P. B. Swan, Montgomery.....	91
A. E. Serburne, North Pomfret.....	95
E. A. Harrington, West Hartford.....	95
D. A. Kneeland, Waitsfield.....	93
Seaver D. Wright, White River Junction.....	93
G. M. Hayward, Middlebury.....	94
J. B. Candon, Pittsford.....	96
Charles Gates & Sons, Hartland.....	96
L. B. Page, Randolph Center.....	93
L. W. English, Woodstock.....	95½
E. A. Darling, East Burke.....	94
Roland F. Robinson, Ferrisburg.....	92
Elton P. Haynes, Randolph Center.....	96
E. F. Kibby, Randolph Center.....	94
D. A. Blain, Barnet.....	97
George Gebbie, Groton.....	96

CREAMERY BUTTER.

T. E. Donohue, Burlington.....	95
J. D. Santamore, Stowe.....	93
John Bond, East Montpelier.....	94
F. A. Rist, Wilmington.....	95
S. L. Harris, Proctor.....	96
W. P. Stone, Strafford.....	95
C. M. Lilley, Marshfield.....	95
Granite City Cooperative Creamery, Barre.....	92
T. J. Orne, Cabot.....	96½
Hardwick Creamery.....	96
Green Mountain Creamery, North Craftsbury.....	94
Gulf Road Creamery, Randolph, Center.....	95
A. M. Chandler, North Montpelier.....	95
W. A. Vancour, East Hardwick.....	96
W. C. Porter, Sharon.....	94
Tunbridge Cooperative Creamery, Tunbridge.....	97½
Whole Number of entries.....	38
Highest score.....	97½
Lowest score.....	91
Average score.....	94½
Association Gold Medal and Creamery Sweepstakes Cup Tunbridge Cooperative Creamery, Score...	97½
Dairy Sweepstakes Cup, D. A. Blain, Barnet. Score..	97

ORGANIZATION EFFECTED.

CREAMERY OPERATORS AND MANAGERS FORM VERMONT ASSOCIATION

Fully 75 creamery operators and managers met in Morrill Hall at four o'clock yesterday afternoon to take up the question of forming a Vermont association. The matter was talked over fully and Prof. A. N. Rudnick, superintendent of dairy extension at Iowa State College, and secretary of a similar association in that State, was asked many questions, which he answered satisfactorily.

A vote was taken and it was unanimously decided to go ahead and organize, after which the constitution and by-laws which had been submitted, were adopted. It was voted to have the board of directors revise the by-laws and have them voted on at the next State meeting.

A board of directors was elected as follows: J. B. Hoag, manager of the Grand Isle Creamery, Grand Isle; A. D. Lynch, West Hartford creamery, West Hartford; E. C. Hillis, manager of the North Montpelier creamery, North Montpelier; W. P. Frost, manager of the Windham County Dairy company, Brattleboro; and B. C. Jennings, manager of the Lamoille Valley creamery, Hardwick.

The board of directors will meet soon and elect a president and secretary and make plans for carrying on the work of the organization.

SCORING RESULTS.

Announcement of the results of the butter scoring and sugar scoring were made yesterday as follows: In the creamery butter scoring, the association gold medal and creamery sweepstakes cup went to the Tunbridge Co-operative Creamery, with a score of $97\frac{1}{2}$. The dairy sweepstakes cup was awarded to D. A. Blain of Barnet, with a score of 97.

The scores in the dairy class were as follows: H. M. Lee, Windsor, 95; P. B. Swan, Montgomery, 91; A. E. Sherburne, North Pomfret, 95; E. A. Harrington, West Hartford, 95; D. A. Kneeland, Waitsfield, 93; Seaver D. Wright, White River Junction, 93; G. M. Hayward, Middlebury, 94; J. B. Candon, Pittsford, 96; Charles Gates & Sons, Hartland, 96; L. B. Page, Randolph Center, 93; L. W. English, Woodstock, $95\frac{1}{2}$; E. A. Darling, East Burke, 94; Rowland F. Robinson, Ferrisburg, 92; Elton P. Haynes, Randolph Center, 96; E. F. Kibby, Randolph Center, 94; D. A. Blain, Barnet, 97.

Creamery butter, F. E. Donahue, Burlington, 95; J. D. Santamore, Stowe, 93; John Board, East Montpelier, 94; F. A. Rist, Wilmington, 95; S. L. Harris, Proctor, 96; W. P. Stone, Strafford, 95; C. M. Lilley, Marshfield, 95; Granite City Co-operative Creamery, Barre, 92; T. J. Orne, Cabot, 94; Milton Dairy company 94; T. J. Orne, Cabot, $96\frac{1}{2}$; Hardwick Creamery, 96; Green Mountain Creamery, North Craftsbury, 94; Randolph Co-operative Creamery, Randolph, 94; Gulf Road Creamery, 95; A. M. Chandler, North Montpelier Co-operative Creamery, 95; W. A. Vancour, East Hardwick, 96; W. C. Porter, Sharon, 94; Tunbridge Co-operative Creamery, $97\frac{1}{2}$.

The whole number of entries was 38. The highest score was $97\frac{1}{2}$, the lowest, 91, the average $94\frac{1}{2}$.

THE WOMEN'S AUXILIARY.

The association of the dairymen's wives and daughters met yesterday afternoon at three o'clock in the Billings library. The meeting was opened by the president, Mrs. H. M. Farnham of Montpelier, who gave words of welcome and briefly outlined the history of the association, which was organized in 1893 and which is the only farmers' organization that belongs to the Federation of Woman's clubs. The reports of the secretary and treasurer were read and adopted, the constitution and by-laws re-drafted and the new constitution and by-laws read and accepted. The following officers were elected for two years: President, Mrs. H. M. Farnham, Montpelier; vice-president, Mrs. O. L. Martin, Plainfield; secretary and treasurer, Mrs. H. L. Wright, St. Albans. The meeting adjourned for the year.

RECEPTION AT GRASSMOUNT

A reception was held at Grassmount from 4 to 6 yesterday afternoon for the association of the dairymen's wives and daughters. In the receiving line were Dean Pearl Randall Wasson, Mrs. H. M. Farnham of Montpelier, president of the association, Mrs. S. L. Harris, Mrs. J. L. Hills, Mrs. A. B. Buell, Miss Katherine McSweeney. Tea was served. Mrs. F. B. Jenks, Mrs. Thomas Bradlee, Mrs. E. L. Ingalls and Miss Alice Blundell poured. Music was furnished by J. F. Kelley, pianist, and D. P. Platka, violinist.

WOMEN'S MEETING.

ASSOCIATION OF DAIRYMEN'S WIVES AND DAUGHTERS HEAR ADDRESSES

Nearly 100 women of the association of Dairymen's Wives and Daughters from all parts of the State held a meeting on the roof garden of Hotel Vermont yesterday afternoon. Mrs. H. M. Farnham of Montpelier presided. Several selections of music were given by a superintendent's male quartet, composed of Maurice Outland of Williams-town, 1st tenor; W. B. Lance, Plainfield, 2nd tenor; B. A. Colby, Shelburne, 1st bass; M. H. Willis, Waterbury, 2nd bass. A noted leader, J. E. Bourier, sent from Worcester, Mass. by the Worcester Salt company, conducted community singing. Mrs. O. L. Martin of Plainfield gave an interesting outline of her trip across the continent to Portland, Oregon, where she attended the National Convention of Grangers.

Mrs. Pearl Randall Wasson, dean of women at the University of Vermont, spoke on "The New Vision of International Sisterhood." She spoke of education and organizing an active plan for sending American students to foreign universities and bringing foreign students to American universities to get an interchange of ideas and different viewpoints. Mrs. Wasson said 95 per cent of the school teachers of America were women. She said women are tired of war, are for universal peace and deeply feel the responsibility of new citizenship.

C. H. Dempsey, Vermont's commissioner of education, used as his subject, "The Place of the Public Schools in the Rural Community." The chief educational problem is the rural education, and sound education is the basis of good citizenship. The development of rural education has been a serious task, and school reports that date back a hundred years show that this has been discussed. People are alive to the conditions of the rural schools, said Mr. Dempsey, but why so much talk, and little action? The thing that confronts us is, why do our schools continue in this unsatisfactory condition? Here and there our rural school build-

ings are renovated and new ones placed. While we realize this actual need, let us make a definite and concrete endeavor to have our rural schools better. The first requisite is a school building because in order to work to advantage we must have good tools. Every rural school building should be attractive, well lighted, heated and ventilated, be furnished with satisfactory equipment, have proper sanitary facilities, possess an ample playground, and be kept in good condition and repair, to the end that the moral, physical and intellectual well-being of the boys and girls may be promoted. Now for teachers: Statistics show that very few teachers are improperly prepared, a majority of the children being taught by high grade teachers. A difficulty met by the superintendent is that the average salary is not satisfactory; a poorly-paid teacher is a poor investment. In order to have first-class teachers we must pay a good salary. Teaching is a calling and in order to get good teachers we must treat them right. When a well-equipped school building and good teachers have been secured, the parents of the community should acquaint themselves with the school and show a lively interest.

SPECIALLY NOTED.

That following the presentation of a handsome gavel to the Dairymen and Sugarmakers of Vermont by E. E. Sisson of Providence, Rhode Island, an always-present member at the conventions, the sessions were called to order of business on time and things moved in a more systematic manner. The gift was speedily acknowledged by a rising vote of thanks of the audience.

That the absence of the Bickfords (regular attendants for the past ten years) was a matter of frequent comment on all sides.

That the furnishing of a leader for community singing and the song sheets was one of the most pleasurable acts the Worcester Salt people have done for the association.

That the cafeteria is an indispensable part of the annual convention. Who could possibly possess gustatory and aesthetic senses not gratified by such concoctions as Ayrshire ale, Holstein highballs, Jersey juleps, Shorthorn shakes, Guernsey gargles, to say nothing of sandwiches of all descriptions in the dairy line, oyster stews, ice creams, et cetera. Despite the toothsome-ness of the eatables, on various and sundry occasions it was observed that many staid dairymen did not overlook the opportunity of admir-

ing the fair college maids who served the "feed" and of holding conversation when they thought somebody wasn't looking.

That the veteran butter scorer Orin Bent of Boston was in his usual happy mood, and was kept busy while outside the butter room, shaking hands and greeting his friends.

ANNUAL MEMBERS 1922

Abell, C. M.....Enosburg Falls	King, O. E.....Washington
Associated Industries of Vt., L. A. Kelty, Montpelier	Kingsley, J. W. 423 St. Paul St., Burlington
Ayrshire Breeder's Assn...Brandon	Lance, W. B.....Plainfield
Butler, Edward.....Essex Jct.	Martin, Andrew M.....Rutland
Bailey, Edward.....Waterbury	Marcy, G. F.....E. Berkshire
Chandler, A. M.....No. Montpelier	Marble, C. H. 33 So. Market St., Boston, Mass.
Cullen, J. W. 618 Tremont Bldg. Boston, Mass.	Morgan, F. L. 377 Warren St., Roxbury, Mass.
Cook, R. C.....Mt. Holly	McKnight, Geo.....E. Montpelier
Cook U. W.....Mt. Holly	Marshall, H. D... 50 Congress St., Boston, Mass.
Cook, E. J.....Mt. Holly	Nelson, G. M.....E. Barnet
Carleton, C. R.....Poultney	Orne, T. J.....Cabot
Cudahy Packing Co.,...Denver, Col.	Oliver, Chas.....Woodstock
Darling, E. A.....E. Burke	Osha, C. O.
Doane, D. W. 128 Colchester Ave., Burlington.	Putnam, C. S.....Bethel
Dana, R. R.....Belmont	Perry, D. A.....Barre
Dow, A. L.....W. Hartford	Rist, F. A.....Wilmington
Dow, F. S.....St. Johnsbury	Rich, Davis, 288 Maple St., Burlington
Douglas, Geo. B.....St. Albans	Rumsey, Geo. H. Montpelier R. F. D.
De Wolf, G. E.....Middlebury	Rhinehart, Geo. W. Co., Inc. 345 W. 1st St., So. Boston, Mass.
English, L. W.....Woodstock	Robinson, R. F.....Ferrisburg
Fuller, F. F.....Waterbury	Story, C. M.....Swanton
Fullam, Rex. A. 144 Elm St., Montpelier	Squires, D. A.....Charlotte
Granite City Co-operative Cry., Co., Barre	Simpson, Arthur,....Lyndonville
Gilfillan, W. A.....So. Ryegate	Smith, W. E. 131 State St., Boston, Mass.
Guptil, S. W.....Waterbury	Shedd, M. E.....E. Georgia
Grant, T. P. 9 Fulton St., Boston, Mass.	Saunders, M. C. 61 Chatham St., Boston, Mass.
Goodinier, G. A.....Troy, N. Y.	Stanley, Dr. E. A.....Waterbury
Hall, Robert.....No. Randolph	Santamore, J. D.....Stowe
Haynes, E. P.....Randolph Ctr.	Tiffany, G. H.....E. Berkshire
Honora, Wm.....Mt. Holly	Tyler, E. F.....Randolph Ctr.
James, C. S. & Sons....Middlebury	The Elyria Enameled Products Co. 49 Federal St., Boston, Mass.
Joslin, W. C.....Waitsfield	Vancour, W. A.....E. Hardwick
Johnson, A. E.....Randolph	
Kibby, E. F.....Randolph Ctr.	
Knapp, G. A. ....St. Johnsbury	

LIFE MEMBERS OF THE VERMONT DAIRYMEN'S
ASSOCIATION, 1922.

A	Allen, Charles.....East Berkshire
Arms, R. A.....Williston	Allen, H. A.....West Milton
Alden, B. H.....Orleans	Allen, Henry.....Pawlet
Adams, G. H.....South Barre	Adams, William H., 369 Marlboro St., Keene, N. H.

Aseltine, M. L....Springfield, Mass.	Bristol, E. S.....Vergennes
Aldrich, E. O., R. F. D. No. 2, Clarendon	Bellows, F. A.....No. Ferrisburg
Allen, G. A., R. F. D. No. 2, West Brattleboro	Boyden, C. F.....Randolph Center
Allen, F. E., R. F. D., South Royalton	Bristol, R. H.....Vergennes
Ansboro, J. E.....Derby	
Adams, C. A.....Derby	
	C
B	Curtis, H. B.....St. Albans
	Conn. Agricultural College, Storrs, Conn.
Baker, O. W.....Concord	Clifford, A. P.....North Pomfret
Bruce, M. K.....Passumpsic	Cushman, G. L., 75 S. Market St., Boston, Mass.
Badger, C. A.....E. Montpelier	Carpenter, E. P....West Waterford
Burnett, R. E.....Bethel	Chaffee, J. H.....West Enosburg
Burbank, J. A.....North Pomfret	Congdon, Edwin .....Clarendon
Burr, L. R.....North Clarendon	Cahee, L. J.....Brandon
Brownell, C. W.....Burlington	Cook, Nelson P.....Mt. Holly
Brigham, William O....Bakersfield	Currier, P. W.....Montpelier
Burt, William .....Essex	Clarke, M. S.....Clarendon
Blair, N. B.....Morrisville	Clarke, F. H.....Williston
Bliss, Abner .....Georgia	Corliss, N. L.....Swanton
Bates, A. E.....Huntington	Carter, W. E.....Pittsford
Brown, J. S.....Plymouth	Carrigan, J. D.....Pittsford
Bishop, D. B.....North Williston	Cady, W. N.....Middlebury
Byington, C. M.....Charlotte	Creed, C. A.....Pittsford
Bigelow, A. P.....Middlesex	Campbell, H. W....Bethany, Neb.
Burke, J. E.....Burlington	Chapman, J. H.....West Rutland
Burnham, W. F.....So. Royalton	Chaffee, Geo. H.....Rutland
Barry, R. A., 173 Chambers St., New York City	Cooke, Geo. S.....E. Hardwick
Bliss, D. S.....Middlebury	Crampton, M. S.....Rutland
Beach, H. F....R. F. D., Vergennes	Cowdon, H.....St. Johnsbury
Brooks, H. K.....St. Albans	Colvin, J. C.....West Rutland
Brigham, E. S.....St. Albans	Cunningham, W. F.....St. Albans
Briggs, E. L.....North Pomfret	Colburn, R. M.....Springfield
Burnett, E. A. University, Lincoln, Neb.	Crampton, Charles A...St. Albans
Bond, John.....East Montpelier	Cobb, C. H., R. F. D., No. 2, Fairfax
Blood, W. O.....Norwood, N. Y.	Crane, George.....Brookfield
Bass, E. L.....Randolph	Chase, C. P.....Proctorsville
Bruce, H. C.....Milford, N. H.	Chandler, G. C.....Montpelier
Barry, Leonidas.....Springfield	Chase, Perry.....East Fairfield
Brackett, W. R., 9 Chatham St., Boston, Mass.	Carpenter, O. G.....Cambridge
Bean, G. C.....Coventry	Candon, J. B.....Pittsford
Belden, H. W.....Waitsfield	Cloverdale Creamery, North Underhill
Bickford, F. H.....Bradford	Chamberlin, H. D., McIndoes Falls
Buxton, J. E.....Middletown Springs	Campbell, Archie, R. F. D., South Ryegate
Brock, L. F.....Barnet	Curtis, A. C.....St. Albans
Barber, E. L.....North Williston	Carter, A. C.....Rutland
Bushnell, H. N.....Waitsfield	Clark, Homer F.....Charlotte
Burrell, D. H.....Little Falls, N. Y.	
Brewer, J. R.....Hingham, Mass.	D
Burgham, W. H.....Montpelier	
Bent, Orrin, 15 Ashburton, Place, Boston, Mass.	Dale, O. W.....White River Jct.
Boutwell, W. C.....Princeton, Me.	Donahue, W. C.....Monkton
	Draper, F. W.....Enosburg Falls

Hayes, J. R.....Stafford
 Higley, Nathan.....Richmond
 Hodges, R. W....Springfield, Mass.
 Harwood, Burr,
 R. F. D. 1, Salem, N. Y.
 Harris, S. L.....Proctor
 Huntley, George M.,

 R. F. D., Fairfax
 Hopkins, Hermann, Jr.,
 Sheldon Jct.

Harrington, W. H....North Pomfret
 Hyde, Wheeler & Co.,

 41 N. Market St., Boston
 Hastings, C. A.,

 17 Union St., Springfield
 Hayward, F. R.....West Fairlee

Heath, W. E.....Sharon
 Hood, H. P. & Sons....Woodstock

Hood, C. H.,
 494 Rutherford Ave.,

 Boston, Mass.
 Howe, E. L., R. F. D...So. Ryegate

Hazard, G. M.....Charlotte
 Hewitt, Mary.....No. Pomfret

Howard, E. S.....W. Hartford
 Howe, F. B. Burlington

I

Iowa State Library,
 Des Moines, Iowa

Isham, Ed Shelburn
 R. F. D. No. 1, St. George

Irish, V. H.....Enosburg Falls

J

Jones, E. H.....Waitsfield
 Jackson, L. A.....Hartford

Jackson, J. J.....Fair Haven
 Judd, Morton.....Windsor

Jaynes, R. F.,
 65 Central Ave., Lynn, Mass.

Jewett, A. & Son.....Middlebury
 Jones, G. M.....Waitsfield

Jenne, A. M.... R. F. D., Richford
 Johnson, C. C.....Pomfret

Jennings, B. C.....E. Hardwick
 Jewett, Alden H....Williamstown

K

Keyes Wade.....Reading
 Kelley, G. A.....Underhill

Kingsley, H. E.....Montgomery
 Kinnerson, J. R.....Peacham

Kidder, N. D.....Hastings, Neb.
 King, M. D.....Woodstock

Kneeland, D. A.....Waitsfield

L

Leonard, Geo.....Brandon
 Lilly, J. O.....Plainfield

Lyster, T. H.....St. Johnsbury
 Lawrence, Henry.....St. George

Lawless, C. G.
 North Haverhill, N. H.

LePage, Charles.....Barre
 Loveland, J. H.....Norwich

Leary, J. A.....Jericho
 Leonard, W. B.....Orleans

Lewis, M. J.....Woodstock
 Lewis, A. L.....Rochester

Lilly, C. M.....Marshfield
 Leonard, C. H.....No. Pomfret

Lure, H. E.....So. Pomfret

M

Manning Mfg. Co.....Rutland
 McCuen, R. W.....Vergennes

Maynard, A. S.....Bakersfield
 Marvin, Thomas.....Montpelier

Mosely, F. W.....Clinton, Iowa
 Messer, F. A.....Greensboro

Moore, A. A.....Richford
 Maxham, G. R.....Woodstock

Merrill, H. J.,
 R. F. D., No. 2, Burlington

Milligan, F. B.....Walden
 McMahon, C. L.....Stowe

McLam, J. F.....So. Ryegate
 Macomber, F. H.....Shelburne

McNall, J. M.....Milton
 McGaffey, E. E.,

 Board of Trade Bldg.,
 Boston, Mass.

Martin, C. D.
 East Corinth

Mass., Agricultural College,
 Amherst, Mass.

McDonough, P. M.....Hinesburg
 Martin, O. L.....Plainfield

McLam, G. E.....Topsham
 Moody, Mark L.....Waterbury

Metcalf, R. H.....Stowe

N

Nelson, F. B.Salisbury
 Nelson, David,
 34 Allen Ave., Springfield, Mass.

Newton, C. H.....Fargo, North Da.
 Nay, Y. G.....Winooski

Northrup, P. B. B.....Sheldon
 Newell, Bigelow.....Stowe

Nute, Byron,
 Marion, Mass., R. F. D. 1

Newton, W. D.,
 R. F. D., St. Albans

[Extremely faint and illegible text, likely a list or index of names and addresses.]

NEW YORK N.Y.
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Towne, E. B.....	Milton	Williams, W. H.....	Rutland
Turnbull, J. G.....	Orleans	Wright, Will W.....	Brandon
Tarbox, C.....	Jericho	Wheeler, N. B.,	Bakers Mills, N. Y.
Towle, E. R.....	Enosburg Falls	Wry, I. A.....	St. Albans
Teachout, S. D.....	Essex Junction	Williams, N. G.....	Bellows Falls
Tarbell, E. S.....	Montgomery	Walker, N. S....	Clarendon Springs
Terrill, G. H.....	Morrisville	Woodward, J. S.....	Enosburg
Tottingham, L. H.....	Shoreham	Winslow, H. L.....	Pittsford
Talcott, D. L.....	Williston	Weed, E. D.....	Hinesburg
Talcott, L. F.....	Williston	Warren, Rufus	Montpelier
Talcott, J. R.,	1760 High St., Oakland, Cal.	Wheelock, H. R.....	Montpelier
Talbott, Frank	Williston	Wright, J. J.....	So. Hero
Tarwell, F.....	Hampton, N. Y.	Whipple, Obed Jr..	North Pomfret
Terrill, A. N.....	Morrisville	Wheeler, F. H.....	Proctorsville
Temple, G. H.....	Randolph Center	Whitney, Ed....	Minneapolis, Minn.
Towle, W. W.....	Enosburg Falls	Wright, H. S.....	North Williston
Trescott, A. J.....	West Rutland	Willard, D. S.....	North Hartland
Tracey, J. E.....	Burlington	Whitney, H. O.....	Essex Junction
Tear, Frank...R. F. D., W. Rutland		Whitelaw, F. R.....	Randolph
U		Wheeler, W. H.....	South Pomfret
Union Association Press,		White, A. R.....	Burlington
47 Ann St., New York		Wallace, Sidney.....	Waterbury
V		Walker, H. W....	South Woodstock
		Williams, J. B.,	Glastonbury, Conn.
		Webb, J. T....	New Braintree, Mass.
		Weed, B. W.....	St. Albans
Vail, H. W.....	Randolph	Whitman, C. D.,	Fishers Island,
Varney, W. M.....	Vergennes	New London, Conn.	
W		Warner, B. F.....	East Burke
		Winslow, Chas L.....	Mt. Holly
		Wright, Seaver D.,	White River Jct.
		Wright Ziegler Co.,	
		12 So. Market St. Boston, Mass.	
Washburn, R. M.,	503 Wilman Bld.,	Wilson, Judge S. C.....	Chelsea
	Minneapolis, Minn.	Note—Your Secretary would consider it a favor if the members would notify him of any changes or corrections in the above list.	
Willard, E. G.....	No Hartland		
Warren, L. H.....	North Pomfret		
Willey Bros.....	Cambridge		
Whitcher, J. R.,	R. F. D. No. 3, Groton		

LIST OF CREAMERIES, SHIPPING STATIONS, CHEESE FACTORIES AND CONDENSARIES OPERATING IN VERMONT—1921.

Prepared by the State Department of Agriculture
ADDISON COUNTY.

Creameries.			
Name of Plant.	Name of Operator.	Post Office Address	Name of Maker or Post Office Address
Elgin Springs Cry.	Elgin Springs Cry. Co.	Addison	Vergennes
Donahue's Cry.	W. C. Donahue	Monkton	Monkton.
Starksboro Coop. Cry.	Starksboro Coop. Cry. Co.	Starksboro	Starksboro
Lake Dunmore Cry.	Lake Dunmore Cry. Co.	Salisbury	Salisbury
Lincoln Cry.	Lincoln Coop. Cry. Co.	Lincoln	Lincoln
Orwell Cry.	Tait Brothers	Springfield, Mass.	Orwell
Vergennes Cry.	I. F. Donahue	Vergennes	Vergennes
Middlebury Cry.	Coon's Ice Cream Co.	Burlington	Middlebury
Noyes' Cry.	K. E. Noyes	Salisbury	Salisbury
Addison Co. Coop. Dairy Co.	Addison Co. Coop. Dairy Co.	Middlebury	Middlebury
Shipping Stations.			
Sheffield Farms Station	Sheffield Farms Co., Inc.	New York City	Ferrisburg
C. Brigham Station	C. Brigham Co.	Cambridge, Mass.	No. Ferrisburg
Maine Creamery Station	Maine Creamery Co.	Providence, R. I.	Ferrisburg
Sheffield Farms Station	Sheffield Farms Co., Inc.	New York City	Vergennes
Sheffield Farms Station	Sheffield Farms Co., Inc.	New York City	New Haven Jct.
Bronx Farms Station	Bronx Farms Co., Inc.	New York City	Salisbury
C. Brigham Station	C. Brigham Co.	Cambridge, Mass.	Leicester Jct.
C. Brigham Station	C. Brigham Co.	Cambridge Mass.	Bristol
Cheese Factories.			
Nichols Cheese Factory		Bridport	Bridport
West Bridport Cheese Factory	West Bridport Cheese Ass'n.	Bridport	Bridport
Shoreham Cheese Factory	Dickinson & Brown	Shoreham	Shoreham
Red Clover Cheese Factory	Red Clover Cheese Ass'n.	East Shoreham	Middlebury, R. D.
Bridport Cheese Factory	Bridport Coop. Dairy Co.	Bridport	Bridport
Hough Crossing Cheese Factory	Dickinson & Brown	Shoreham	Shoreham

BENNINGTON COUNTY

Shipping Stations.

Schade's Milk Station
H. P. Hood & Sons Station
H. P. Hood & Sons Station
Manchester Creamery

William Schade
H. P. Hood & Sons
H. P. Hood & Sons
Manchester Dairy Co.

Jay J. Woodbury
J. Shaw
F. D. McGuire

Rupert
West Rupert
North Rupert
Manchester

No. Rupert Cheese Factory

No. Rupert Cheese Co.

No. Rupert

Frank Root, Secretary

Pawlet

Cheese Factories.

CALEDONIA COUNTY

Creameries.

Barnet Coop. Cry.
Mountain View Cry.
East Barnet Cry.
Lamoille Valley Cry.
Lyndonville Cry.
Danville Cry.
South Walden Cry.
North Danville Cry.
South Peacham Cry.
Pine Hill Cry.
Noyesville Cry.
Moose River Coop. Cry.
McIndoes Cry.
H. P. Hood & Sons

Barnet Coop. Cry. Ass'n.
Mountain View Coop. Cry. Co.
East Barnet Creamery Co.
Lamoille Valley Cry. Ass'n.
Lyndonville Cry. Ass'n.
Danville Coop. Cry. Ass'n.
Holland Cry. Co.
No. Danville Coop. Cry. Ass'n.
So. Peacham Coop. Cry. Ass'n.
Plymouth Creamery Co.
F. A. Messer
Moose River Coop. Cry. Ass'n.
McIndoes Coop. Cry. Ass'n.
H. P. Hood & Sons

Barnet
West Barnet
East Barnet
East Hardwick
Lyndonville
Danville
Springfield Mass.
St. Johnsbury R. D.
South Peacham
Boston, Mass.
Montpelier
McIndoes Falls.
Charlestown, Mass.

J. A. Buffum
A. W. Hastre
J. R. Moore
B. C. Jennings
W. C. Conner
Nelson A. Dole
F. Miner
Fred Gadapee
F. G. Shaw
Mrs. Jenny Buck
Will Thompson
A. B. Judd
D. M. Crane

McIndoes Falls
West Barnet
East Barnet
East Hardwick
Lyndonville
Danville
South Walden
St. Johnsbury R. D.
South Peacham
Wheelock
Walden
East St. Johnsbury
McIndoes Falls.
Groton

Shipping Stations.

Passumpsic Station
Alden Brothers
H. P. Hood & Sons
H. P. Hood & Sons

Plymouth Cry. Co.
Alden Brothers
H. P. Hood & Sons
H. P. Hood & Sons

Boston, Mass.
Boston, Mass.
Charlestown, Mass.
Charlestown, Mass.

A. C. Granger
A. E. Kibbee
H. L. Kay

Passumpsic
Hardwick
Walden Heights
South Ryegate

Condensaries

Name of Plant.	Name of Operator	Post Office Address	Name of Maker or Manager.	Post Office Address.
Plymouth Condensary	Plymouth Creamery Co.	Roston, Mass	H. M. Conditin	St. Johnsbury

CHITTENDEN COUNTY

Creameries.

Milton Coop. Dairy Co., Inc.	Milton Coop. Dairy Co., Inc.	Milton	George Roberts	Milton
Jonesville City.	Borden's Condensed Milk Co.	Richmond	C. C. Fuller	Jonesville
Lake Champlain City.	W. R. Johnson	Pears Junction	A. D. Payne	Pears Junction
Riverside City.	Chauncey Hayden	Underhill	Chauncey Hayden	Riverside
Johnson City.	F. W. Johnson	Huntington	F. W. Johnson	Huntington
Donahue City	M. F. Donahue	Pears Junction	M. F. Donahue	Pears Junction
Burlington Coop. Milk Prod. Co.	Burlington Coop. Milk Prod. Co.			
Pure Milk Products Co.	Pure Milk Products Co.	Huntington	H. E. Newton	Huntington
Shelburne Coop. City Co.	Shelburne Coop. City Co., Inc.	Huntington	A. R. White	Huntington
Richmond Farmers' Coop. Cry.	Richmond Farmers' Coop. Cry.	Shelburne	C. C. Fletcher	Shelburne
		Richmond	Ray Ware	Richmond

Shipping Stations.

Colchester City.	Borden's Condensed Milk Co.	Richmond	P. W. Richards	Colchester
Brown's River City.	Borden's Condensed Milk Co.	Richmond	J. A. Hanley	Pears
Borden's Condensed Milk Co.	Borden's Condensed Milk Co.	Richmond	J. W. Berry	Johnston
Cloverdale City.	Bryant & Chaplain Co.	Richmond	W. H. Conno	Cloverdale
Whiting Station	D. Whiting & Son	Boston, Mass	P. H. Allen	Milton
Borden's Station	Borden's Condensed Milk Co.	Richmond	W. D. Apen	Underhill
Sheffield Farms Station	Sheffield Farms Co., Inc.	New York City	J. Borden	Underhill
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	Ed. Adams	Milton
Oak Hill Station	Borden's Condensed Milk Co.	Richmond	C. C. Austin	Williston
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass	Ed. Adams	New Williston

Condensaries.

Borden's Condensary	Borden's Condensed Milk Co.	Richmond	J. W. Berry	Richmond
Borden's Condensary	Borden's Condensed Milk Co.	Richmond	P. E. Donahue	Huntington

ESSEX COUNTY.

Creameries.

Trout Brook Cry. Co. Norton Mills Creamery	Trout Brook Cry. Co. J. G. Turnbull Co.	Concord Orleans	O. W. Baker Joseph Kehoe	Concord Norton Mills
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Shipping Stations.

H. P. Hood & Sons Lunenburg Station	H. P. Hood & Sons Trout Brook Cry. Co.	Charlestown, Mass. Concord		East Concord Lunenburg
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FRANKLIN COUNTY.

Creameries.

Swanton Coop. Dairy Co. Franklin County Coop. Cry. Maple Hill Cry. Wachusett Cry. St. Albans Coop. Cry.	Swanton Coop. Dairy Co., Inc. Franklin Co. Coop. Cry. Co. Inc. Maple Hill Cry. Co. Inc. E. H. Thayer & Co. St. Albans Coop. Cry. Co. Inc.	Swanton East Berkshire East Berkshire Enosburg Falls St. Albans	George H. Hersey M. J. Quinn G. F. Marcy E. E. Derby H. E. Mooney	Swanton East Berkshire East Berkshire Enosburg Falls St. Albans
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Shipping Stations.

Sheldon Cry. Alden Brothers Station H. P. Hood & Sons Milton Coop. Dairy Corp. Milton Coop. Dairy Corp. H. P. Hood & Sons H. P. Hood & Sons H. P. Hood & Sons	Alden Brothers Alden Brothers H. P. Hood & Sons Milton Coop. Dairy Corp. Inc. Milton Coop. Dairy Corp. Inc. H. P. Hood & Sons H. P. Hood & Sons H. P. Hood & Sons	Boston, Mass. Boston, Mass. Charlestown, Mass. Milton Milton Charlestown, Mass. Charlestown, Mass. Charlestown, Mass.	M. D. Mack F. E. Brady Jim Barry George Roberts George Roberts A. L. Lukes W. J. Jennings A. G. Finn	Sheldon East Fairfield Sheldon Junction Fairfax Georgia East Fairfield Fairfield Highgate Center
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Condensaries.

Federal Packing Co. H. P. Hood & Sons	Nestle's Food Co. H. P. Hood & Sons	New York City Charlestown, Mass.	O. L. King C. Douglass	Enosburg Falls St. Albans
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Cheese Factories.

Name of Plant.	Name of Operator.	Post Office Address.	Name of Maker or Manager.	Post Office Address.
Richford Cry.	National Milk Products Co.	Richford	J. L. Chittappa	Richford

GRAND ISLE COUNTY

Creameries.

South Hero Coop. Cry. Ass'n.	South Hero Coop. Cry. Ass'n., Inc.	South Hero	E. A. Dodge	South Hero
Grand Isle County Coop. Cry. Ass'n., Inc.	Grand Isle County Coop. Cry. Ass'n., Inc.	Grand Isle	J. B. Haug	Grand Isle

Shipping Stations

Boston Jersey Creamery	H. P. Hood & Sons	Charlestown, Mass.	Albert Andre	Alburg
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LAMOILLE COUNTY.

Creameries.

Mt. Mansfield Coop. Cry. & Grain Ass'n., Inc.	Mt. Mansfield Coop. Cry. & Grain Ass'n., Inc.	Stowe	F. B. Stow	Stowe
Wolcott Coop. Cry. Co., Inc.	Wolcott Coop. Cry. Co., Inc.	Wolcott	Chester Robbins	Wolcott
Gold Brook Coop. Cry. Ass'n., Inc.	Gold Brook Coop. Cry. Ass'n., Inc.	Stowe, R. D.	J. D. Santamore	Stowe, R. D.
United Farmers' Coop. Cry. Ass'n., Inc.	United Farmers' Coop. Cry. Ass'n., Inc.	Morrisville	W. D. Hamilton	Morrisville

Shipping Stations.

C. Brigham Co.	C. Brigham Co.	Cambridge, Mass.	Arthur W. Isham	Morrisville
C. Brigham Co.	C. Brigham Co.	Cambridge, Mass.	W. W. Towle	Cambridge Jct.

[ORANGE COUNTY.

Creameries.

Green Mountain Cry. Corinth Cry.	Green Mountain Cry. Co. Lyndonville Cry. Ass'n.	Waits River Corinth	Waits River Corinth
Topsham Coop. Cry. Co.	Topsham Coop. Cry. Ass'n.	Topsham	Topsham
Randolph Coop. Cry. Co.	Randolph Coop. Cry. Co.	Randolph	Randolph
Washington Coop. Cry. Ass'n.	Washington Coop. Cry. Ass'n.	Washington	Washington
Williamstown Cry.	Lyndonville Cry. Ass'n.	Williamstown	Williamstown
Gulf Road Coop. Cry. Ass'n., Inc.	Gulf Road Coop. Cry. Ass'n., Inc.		
So. Strafford Coop. Cry. Co.	So. Strafford Coop. Cry. Co.	No. Randolph	No. Randolph
Wells River Coop. Cry. Ass'n.	Wells River Coop. Cry. Ass'n.	So. Strafford	So. Strafford
Orange County Cry.	Orange County Coop. Cry. Co.	Wells River	Wells River
Tunbridge Cry.	Tunbridge Coop. Cry. Ass'n.	Chelsea	Chelsea
Farmer's Coop. Cry. Co.	Farmers' Coop. Cry. Co.	Tunbridge	Tunbridge
West Fairlee Cry.	Neapolitan Ice Cream Co.	E. Corinth	E. Corinth
Vershire Cry.	Vershire Coop. Cry. Ass'n.	Cambridge, Mass.	Vershire
Lake Morey Cry.	Neapolitan Ice Cream Co.	Cambridge, Mass.	Fairlee

Shipping Stations.

C. Brigham Station Boston, Jersey Cry.	C. Brigham Co.	J. J. Stimets	Randolph
H. P. Hood & Sons Highland Cry.	H. P. Hood & Sons	J. A. Ames	No. Thetford
H. P. Hood & Sons	H. P. Hood & Sons	E. F. Corliss	Boltonville
	Plymouth Cry. Co.	J. W. Layten	W. Newbury
	H. P. Hood & Sons		Piermont

Cheese Factories

Bradford Cry Newbury Cry.	Lyndonville Cry. Ass'n. Lyndonville Cry. Ass'n.	F. H. Bickford G. A. Doe	Bradford Newbury
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Condensaries.

H. P. Hood & Sons	H. P. Hood & Sons	O. W. Terry	Randolph
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ORLEANS COUNTY.

Name of Plant	Name of Operator.	Post Office Address	Name of Maker Manager.	Post Office Address.
W. Charleston Cry.	J. G. Turnbull Co.	Orleans	J. G. Eley	W. Charleston
Lowell Cry.	J. G. Turnbull Co.	Orleans	D. E. Lamberton	Lowell
Black River Cry.	J. S. Bean	Lowell, Mass.	R. H. Bishop	Craftsbury
Orleans Cry.	J. G. Turnbull Co.	Orleans	Ralph Brahana	Orleans
Green Mt. Cry.	Williams & Root	No. Craftsbury	Fred Estell	No. Craftsbury
Holland Cry.	Holland Cry. Co.	Springfield, Mass.	Charles Counter	Derby Line
Caspian Lake Cry.	F. A. Messer	Montpelier	Will Thompson	Greensboro
Jersey Star Cry.	Jersey Cry. Ass'n.	Irassburg		Irassburg
Albany Cry.	J. G. Turnbull Co.	Orleans	C. H. Wilder	Albany
Meadow Brook Cry.	Meadow Brook Cry.	W. Glover	N. C. Stevens	W. Glover
Missisquoi Valley Coop. Cry.	Missisquoi Valley Coop. Cry. Ass'n.	So. Troy	C. I. Hartwell	So. Troy
E. Charleston Cry.	J. G. Turnbull Co.	E. Charleston	George Fox	E. Charleston
Columbia Cry.	H. P. Hood & Sons	Charlestown, Mass.	G. E. Morse	No. Troy
Northern Vermont Coop. Cry. Co.	Northern Vermont Coop. Cry. Co.	Holland	Geo. W. Rumery	Derby Line

Shipping Stations.

Newport Center Cry.	H. P. Hood & Sons	Charlestown, Mass.	Chalres Hutchins	Newport Center
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	R. S. French	Barton
Westwood Farm Milk Co.	Westwood Farm Milk Co.		Max Chamberlin	Newport
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.		Derby Center

Condensaries.

H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	E. L. Towne	Newport
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RUTLAND COUNTY.

Creameries.

Proctor Creamery	Vermont Marble Company	Proctor	S. L. Harris	Proctor
Hortonville Cry.	Tait Bros.	Springfield, Mass.	F. L. Gidding	Orwell, R. D.
Champlain Valley Cry.	Tait Bros.	Springfield, Mass.	J. J. Jackson	Fair Haven
Otter Creek Cry.	Jones Bros.	Brandon, R. D.		Brandon, R. D.

Shipping Stations.

C. Brigham Station
C. Brigham Station
C. Brigham Co.
C. Brigham Co.
C. Brigham Co.
C. Brigham Co.
A. Beckman Station
Castleton Dairy Co. Station
Maple Hyrst Cry
Tait Bros. Station
Berghorn Dairy Co., Inc.
Borden Station
Sheffield Farms Station
West Rutland Cry.
Alden Bros. Station
Orange County Milk Station
Manchester Dairy Co.
H. P. Hood & Sons
H. P. Hood & Sons

C. Brigham Co.
C. Brigham Co.
C. Brigham Co.
C. Brigham Co.
C. Brigham Co.
C. Brigham Co.
A. Beckman
Castleton Dairy Co.
Tait Bros.
Tait Bros.
Berghorn Dairy Co., Inc.
Borden's Condensed Milk Co., Inc.
Sheffield Farms Co., Inc.
George W. Lamphere
Alden Bros.
Tait Bros.
D. Buttrick
H. P. Hood & Sons
H. P. Hood & Sons

Cambridge, Mass.
Cambridge, Mass.
Cambridge, Mass.
Cambridge, Mass.
Cambridge, Mass.
Cambridge, Mass.
New York City
New York City
Springfield, Mass.
Springfield, Mass.
New York City
New York City
New York City
New York City
West Rutland
Boston, Mass.
Springfield, Mass.
Arlington, Mass.
Charlestown, Mass.
Charlestown, Mass.

C. J. Wilbur
R. O. Bugby
A. W. Needham
F. E. Martin
H. C. Campbell
C. L. Graves
Richard Durkee
Henry Juckett
J. A. Wells
J. J. Jackson
Amos Juckett
D. E. Decker
M. P. Leonard
G. W. Lamphere
P. O. Eddy
W. W. Smith
A. B. Seward
Ed Cramer

Wallingford
Wallingford
So. Wallingford
Rutland
Danby
Castleton
W. Pawlet
Benson
Fair Haven
Fair Haven
Poultney
Florence
W. Rutland
Brandon
Brandon
E. Wallingford
W. Pawlet
Cuttingsville

Cheese Factories.

Gleason Cheese Factory
Union Cheese Factory
West Pawlet Cheese Factory
Riverside Cheese Factory
Cold River Cheese Factory
Eureka Cheese Factory
Blakeley Cheese Factory
Mt. Holly Cheese Factory
Crowley Cheese Factory
Aldrich Cheese Factory
E. Poultney Cheese Factory
Tarbleville Cheese Factory
Spring Valley Cheese Factory
Gilt Edge Cheese Factory

F. L. Russell
Union Cheese Co.
C. H. Kinne
W. W. Jenks
R. E. Plumley
Floyd Pratt
Frank Blakeley
George Woodbury
A. W. Crowley
W. E. Aldrich
E. Poultney Cheese Co.
W. E. Aldrich
Spring Valley Cheese Co.
Gilt Edge Cheese Co.

Cuttingsville
Middletown Springs
West Pawlet
Ira
No. Clarendon, R. D.
Middletown Springs
Pawlet
Cuttingsville
Belmont
Cuttingsville
Poultney
E. Wallingford
Middletown Springs
Castleton

W. E. Bruce
P. O. Wescott
C. H. Kinne
W. W. Jenks
R. E. Plumley
Floyd Pratt
Frank Blakeley
George Woodbury
A. W. Crowley
W. E. Aldrich
George Baker
Charles Waters
W. A. Bogart
D. H. C. Lincoln

Cuttingsville
Middletown Springs
W. Pawlet
West Rutland
No. Clarendon
Middletown Springs
Pawlet
Cuttingsville
Belmont
Cuttingsville
E. Poultney
E. Wallingford
Middletown Springs
Castleton

WASHINGTON COUNTY.

Creameries.

Name of Plant.	Name of Operator.	Post Office Address	Name of Maker or Manager.	Post Office Address
Marshfield Coop. Cry. Ass'n., Inc.	Marshfield Coop. Cry. Ass'n., Inc.	Marshfield Barre	C. M. Lilley	Marshfield Barre
Granite City Coop. Cry., Inc.	Granite City Coop. Cry., Inc.		E. J. Talbert	
E. Montpelier Coop. Cry. Ass'n., Inc.	E. Montpelier Coop. Cry. Ass'n., Inc.	E. Montpelier	John Bond	E. Montpelier
No. Montpelier Coop. Cry. Ass'n., Inc.	No. Montpelier Coop. Cry. Ass'n., Inc.	No. Montpelier	E. C. Hillis	No. Montpelier
Northfield Coop. Cry. Ass'n., Inc.	Northfield Coop. Cry. Ass'n., Inc.	Northfield	W. J. Prindle	Northfield
E. Calais Coop. Cry. Ass'n., Inc.	E. Calais Coop. Cry. Ass'n., Inc.	E. Calais	Guy Bancroft	E. Calais
Cabot Farmers' Coop. Cry. Ass'n., Inc.	Cabot Farmers' Coop. Cry. Ass'n., Inc.	Cabot	T. J. Orne	Cabot
Warren Coop. Cry.	Warren Coop. Cry.	Warren	H. N. Paquette	Warren
Mad River Valley Cry	H. W. Belden	Waitsfield	H. W. Belden	Waitsfield
Worcester Coop. Cry. Ass'n., Inc.	Worcester Coop. Cry. Ass'n., Inc.	Worcester	R. B. Montgomery	Worcester

Shipping Stations.

C. Brigham Co. Station	C. Brigham Co.	Cambridge, Mass.	M. C. Washburn	Waterbury Ctr.
C. Brigham Co. Station	C. Brigham Co.	Cambridge, Mass.	M. C. Washburn	Waterbury
Mark Moody Station	Mark Moody	Waterbury	Earl Seaver	Waterbury
Moretown Cry Station	The Bryant & Chapman Co.	Hartford, Conn.	F. H. Sayer	Moretown
Middlesex Cry. Station	The Bryant & Chapman Co.	Hartford, Conn.	L. B. Palmer	Middlesex
Montpelier Cry.	H. P. Hood & Sons	Charlestown, Mass.	Harry Colombo	Montpelier
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	C. E. Bixby	Barre
Plainfield Cry. Station	Robert M. Burnett	Southboro, Mass.	E. J. Bartlett	Plainfield

WINDHAM COUNTY.

Creameries.

Windham Co. Coop. Milk Pro- ducers, Inc.	Windham Co. Coop. Milk Pro- ducers, Inc.	Brattleboro	W. P. Frost	Brattleboro
Belhows Falls Coop. Creamery, Inc.	Belhows Falls Coop. Creamery, Inc.	Belhows Falls		Belhows Falls
North River Cry.	North River Cry. Ass'n.	Jacksonville	F. A. Rist	Jacksonville
Deerfield Valley Cry.	Deerfield Valley Cry. Ass'n.	Wilmington	L. H. Higgins, Sec'y	Wilmington
Windham County Cry.	Windham County Cry. Ass'n.	Newfane	J. E. Gleason	Newfane
Wardsboro Cry.	Wardsboro Coop. Cry. Co.	Wardsboro	C. Sorenson	Wardsboro
Guilford Coop. Cry.	Guilford Coop. Cry. Ass'n.	Brattleboro, R. D.	R. R. Holbrook	Brattleboro, R. D.
Holbrook Cry.	R. R. Holbrook	Townshend	Harry Sparks	Townshend
West River Cry.	West River Cry. Co.	So. Londonderry.....	A. M. Lovenberg	So. Londonderry
Canoe Brook Farm Cry.	A. M. Lovenberg	Putney		Putney

WINDSOR COUNTY.

Creameries.

Elm Valley Cry.	Belknap & Sons	Cavendish	D. H. Belknap	Cavendish
White River Valley Coop. Cry.	White River Valley Coop. Cry. Ass'n., Inc.	Rochester	R. H. Holland	Rochester
Maplehurst Cry.	J. H. Mussey	Stockbridge	J. H. Mussey	Stockbridge
Silver Lake Cry.	F. E. Allen	Barnard	F. H. Adams	Barnard
Moore's Cry.	E. F. Moore	So. Royalton, R. D.	E. F. Moore	So. Royalton, R. D.
Harrington Cry.	Ayer & Ferson	Bethel	Ayer & Ferson	Bethel (Destroyed by fire)
Sherburne's Cry.	A. E. Sherburne	No. Pomfret	A. E. Sherburne	No. Pomfret
Sharon Coop. Cry.	Sharon Coop. Cry. Ass'n.	Sharon	W. C. Porter	Sharon
West Hartford Cry.	A. L. Dow	West Hartford	A. D. Lynch	West Hartford
Sylvan Glen Cry.	F. C. Putnam	So. Royalton, R. D.	F. C. Putnam	So. Royalton, R. D.

Shipping Stations.

Name of Plant.	Name of Operator.	Post Office Address	Name of Maker or Manager.	Post Office Address.
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	R. A. Wells	Woodstock
Whiting Cry. Station	D. Whiting & Son	Boston, Mass.	F. D. Jackson	Hartland 4 Corners
Whiting Cry. Station	D. Whiting & Son	Boston, Mass.	L. W. Hitchcock	Ascutneyville
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	R. J. Patterson	Norwich
Child Bros. Cry. Station	Child Brothers	Waltham, Mass.	A. C. Cripps	Brownsville
Manchester Cream Co. Station	Manchester Cry. Co.	Windsor	J. A. McGuire	Windsor
Cheese Factories.				
Plymouth Cheese Factory	Plymouth Cheese Co.	Plymouth	E. C. Aldrich	Plymouth
Nickles Hopas Cheese Factory	Nickles Hopasa	East Barnard	Nickle Hopsas	So. Royalton R. D.
Weston Cheese Factory	Peter John	Boston, Mass.		Weston

Where no other state is mentioned, the address is Vermont.

The condensaries are counted with the shipping stations because they often ship milk and cream. All those plants which have one or more large vacuum condensing pans are listed as condensaries. Several of the creameries ship milk and cream at odd times and several make some cheese. A number of the shipping stations also make butter and cheese. The cheese factories often make a little butter and ship milk and cream.

REPORT
OF THE
Fifty-First Annual Convention
OF THE
Vermont
Dairymen's Association
HELD AT
University of Vermont Gymnasium
BURLINGTON, VERMONT
JANUARY, 11, 12, 13, 1921.



ST. ALBANS, VT.
ST. ALBANS MESSENGER PRINT
1921

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**OFFICERS OF THE VERMONT DAIRYMEN'S
ASSOCIATION.****PRESIDENT**

S. L. HarrisProctor

VICE-PRESIDENTS

E. C. HillisE. Montpelier
G. H. Terrill.....Morrisville

SECRETARY

O. L. Martin.....Plainfield

TREASURER

W. H. Harrington.....North Pomfret

AUDITOR

F. L. Davis.....Hartford

**PROCEEDINGS OF THE 51st ANNUAL MEETING OF THE
VERMONT DAIRYMEN'S ASSOCIATION.**

THE GYMNASIUM, UNIVERSITY OF VERMONT, BURLINGTON,
VERMONT, JANUARY 11, 12, 13, 1921.

The 51st Annual Meeting of the Vermont Dairymen's Association convened at 2 o'clock, January 11th.

INVOCATION.

REV. C. J. STAPLES, BURLINGTON, VERMONT.

Our God of the open sky and of the fruitful earth, for a moment we would realize something of Thy share in the works of our hands. Thine is the sunshine that pours upon the earth in the days of spring-time; Thine are the showers that descend upon the waiting ground; Thine are the brooks that run among the hills, and the lakes that mirror the mountains—and in Thy name we would go forth to care for those whom Thou hast placed in our care; all sheep and oxen, yea and the beasts of the field, the fowls of the air,—in Thy name we would labor that we may bring forth that which is useful and that which is helpful into the life of our fellow-men. In Thy name we would succor those that are in want; in Thy name we would make this earth a bounteous harvest field for all mankind; and we would not be unmindful of the cry of Thy children that comes across the sea, the cry of those who are in misery and pain, the cry of those that are void indeed of education, of enlargement of mind, distant countries in distress and the midst of disease. Grant that we may be one together in our search for things high and pure and true, and so be faithful children of the trust which Thou hast placed within our keeping, and in the name and memory of Him Who went about doing good among the hills and valleys of far off Palestine, we in His spirit would minister to one another, and in ministering to one another show forth our gratitude to the giver of all good. Amen.

ADDRESS OF WELCOME.

JAMES E. TAYLOR, (In absence of Mayor Jackson.)

Members of the Vermont Dairymen's Association and of the Vermont Maple Sugar Makers' Association:

Of course, from the very beginning of time men have felt that agricultural production was superlatively important and that of all civilization you were the real fellows, but they never had the fact "rubbed in" until the War; and now Vermont, of all states in the union, realizes the fundamental importance of you and your work; and we of the cities feel that about all that the city is for, is to exist in. I think the men of the cities are intensely interested in the objective you have before you, to make Vermont the very best cattle market in the United States; to see to it that from the point of yield and quality the Vermont cow is the cow of the United States, and that from all over the Union men come here to buy the best. I think city men feel they are helping you in that work; their legislative appropriations and their work along other lines are not merely for the sake of doing something for the country but they are doing something for the city as well, and carrying out Vermont's slogan "Quality superlative"—not so much quantity as is represented in many other states, but *quality*. But we must remember that we are not only a land flowing with milk but also a land flowing with maple sweets. We realize in the development of this product that we must see to it that every producer produces according to the best methods and we know that the manufacturer of the very best sweet obtains the very best price,—and that is a proposition that all are interested in. The matter of advertising is of utmost importance, and should receive most careful and constant attention on the part of the producers, both of the sweet and milk as well. We want to tell the world the truth about our Vermont products. We are mighty glad to greet you in Burlington, and we hope more and more you will be helped and help us by coming to our city for your meetings yearly. We want you to know you are right welcome at this time.

RESPONSE TO ADDRESS OF WELCOME

G. H. TERRILL, MORRISVILLE.

It is with a great deal of pleasure that I respond to this hearty welcome by the City of Burlington to our Association. My mind goes back thirty years ago when I first joined this Association. At that time three-quarters of the exhibits were dairy butter, dairy products for the home dairies. Today conditions have changed and more than three-quarters of the products on exhibition here are from the creameries. Vermont has changed from a butter-making State to a milk-producing State. Three-quarters of all the milk that is shipped to Boston is produced by the State of Vermont. Vermont has more cows than the States of Massachusetts, Rhode Island and Connecticut,—she is distinctively a dairy State. Agriculture is the largest business of the State of Vermont and dairying is the largest business factor in agriculture. Burlington is truly the Queen City of the State and we are always glad to come here, and it would seem as if our future meetings would be held here because of the fact that we have now grown to such proportions that no other city in the State is able to care for us in the shape that Burlington does. We thank you for all you do for our interest, our pleasure and our comfort.

TUESDAY EVENING SESSION.

Va Ness House dining room.

In charge of Vermont Jersey Cattle Club. The hotel orchestra furnished music.

A. L. Tichane, Chief of the Extension Department of the American Cattle Club, of New York, addressed the audience briefly. His remarks were followed by a series of interesting moving pictures, depicting notable cattle. He said in art:—

PRESIDENT'S ADDRESS.

Ladies ad Gentlemen:—

We're meeting for the fifty-first annual convention of the Dairmen's Association. I do not need to give you a history of the association as you all know it is one of the oldest and largest dairy associations in the United States. I think there is only one charter member living and that is E. J. Parker of Grand Isle.

I extend a glad welcome to the Sugarmakers' Association, who meet with us again at this time.

We meet under different conditions throughout the country each year. For the last few years the farmers have received high prices for everything and have been obliged to pay high prices in return. The labor question has seemed to be the most difficult problem with which we have had to contend, and the milking machine came to the rescue just when it was most needed. While the machine is a blessing it is also an added problem as it must be kept absolutely clean in order to insure good cream and butter, but it is to the interest of the farmers to maintain a high standard of cleanliness and produce the best quality obtainable.

Over seventy percent of the state's agricultural income is derived from her dairies, so you can readily appreciate our dependence upon the dairy cow and her products, and can see the necessity of our giving still more consideration to the improvements of our dairies and their output.

There are fewer cows in the New England states today than twenty years ago, but the quality of the cow and her products have improved wonderfully in that time. I give great credit to the Test Association in helping to bring about this improvement.

We all know that in most herds there is the profitable and the unprofitable cow, the latter simply eating up a portion of the profits the good cow makes. The Vermont Test Association has found a great many peculiar instances, where two cows,—standing side by side, fed the same ration, milked by the same person,—will vary in production almost beyond belief. But we know the American farmer well enough to realize that he will not milk a whole herd to make the profit which one cow should show, he will take time to weigh and test and determine the relative merits of his cows and will eventually retain only the cows promising a profitable future herd. By improving the herds it will not be a difficult matter to induce the cows to double their present yield of butterfat.

Vermont is fast becoming a milk shipping state. In Rutland County there are only two creameries making butter at the present time, and we do not want to see the state lose its place as one of the leading manufacturers of fancy butter. One of the problems of the butter maker to-day is to get the cream often enough from the farms. If it is not obtained oftener than once a week the cream develops an old flavor and it is impossible to get good butter from that cream, therefore it will not bring the best price. So it rests with the farmers to cooperate with the creamery, if he wants the highest price for his butterfat. The method of delivering and caring for cream is responsible for three-fourths of the success of butter-making, and cooling the cream immediately after separation is the greatest factor toward success.

I am glad to see that the farmers of Vermont are getting together and forming co-operative creameries and milk plants, as this will prove one of the best means of education along the line of producing more cream and a better quality of milk.

It is always a pleasure for me to visit with the Jersey breeders of Vermont for the reason that I have always had a keen appreciation of their ability as breeders of Jersey cattle, and I know that Vermont is one of the best Jersey breeding states in America even though little more than good breeding operations have been the cause of this reputation. What I mean by this is that it has never seemed to me that the Jersey breeders of Vermont were alive to the great opportunities they have for taking a foremost position in the Jersey breeding world. I look upon the situation from a different angle than you do because the Jersey industry to me is a national proposition, and there are certain spots in this country that I know enjoy enviable reputations

for Jersey breeding, and therefore reap the benefit of their reputation.

Considering the quality of cattle that you have up here, it seems to me that not enough has been done to spread the idea that Vermont is foremost, or at least among the leaders, of states that are Jersey breeding communities. I would therefore suggest that something be done through your organization to put some life into the situation and obtain greater publicity for the work that you are doing.

I realize that it is impossible with officers who do their work the best way they can in spare time to carry on such propaganda work, and I would therefore suggest that you employ a salaried secretary whom you could feel would be obliged to give you an extra amount of service along this line. This suggestion is not made in the spirit of finding fault with any of the present or past officers of this organization, but rather as a means of suggesting that some way be found in which you could compensate someone who would feel obliged to give a certain part of their time to carrying on the secretarial work of such an organization.

The American Jersey Cattle Club is doing everything possible to promote interest in the breed throughout the country, but because of the large territory which it must cover it can only give you a limited amount of support for the present.

As you probably know, other sections of the country are taking up the field man plan on a co-operative basis, which means that they are employing a paid agent on full time to promote their interests, and it looks to me as though something of the sort should be started in the New England States.

Vermont has proved to the world that it is possible to breed and develop just as good animals in your state as in any other state in the Union, and these advantages should therefore be brought to the attention of farmers and dairymen throughout the country, but particularly in Vermont and in states adjacent.

There is a great deal that the American Jersey Cattle Club can undoubtedly do to help you get this valuable publicity and recognition, but there is as much or more that you can do among yourselves through the medium of an effective organization. Something should at once be done to increase the membership of the Vermont Jersey Breeders' Association so that at meetings of this kind hundreds of Jersey breeders will turn out rather than just a handful. According to our records there are in the neighborhood of

seven hundred owners of pure bred Jersey cattle in Vermont, and this offers quite a field for organization work.

It has always been a pleasure for officials of the American Jersey Cattle Club to assist you in everyway possible to maintain a live Jersey organization, and I hope that the meeting which is to take place after my talk to you this evening will go on record as undertaking some one definite thing, in the form of a plan of work that will, during the coming year, promote the Jersey breed to a greater extent than anything that has yet been done.

WEDNESDAY FORENOON SESSION.**APPOINT OF COMMITTEE ON RESOLUTIONS.**

BY THE PRESIDENT.

J. P. Ramsey, Chairman.
S. D. Lynch.
W. H. Vaughan.

PROGRESS OF TUBERCULOSIS ERADICATION.

E. S. BRIGHAM, COMMISSIONER OF AGRICULTURE FOR
VERMONT.

This is my third appearance before this association to discuss the subject of tuberculosis control. In 1918 I talked to you about the accredited herds plan which had been adapted in cooperation with the federal bureau of animal industry; last year our discussion centered around the revision of our live stock laws passed in 1919; this year I would like to report progress and discuss with you the general problem of eradicating this disease from the herds of the state.

Most of you, I believe, are familiar with the plan under which we are now working, but lest there are those who are not, I might spend just a moment in reviewing it. The legislature of 1919 gave authority to prescribe as a condition of making a tuberculin test of a herd, the observance on the part of the owner of such measures as shall be deemed necessary by the commissioner to keep the herd free from tuberculosis. It further did away with indemnity for private tests unless the owner having a test should submit his entire herd under such agreement.

The measures prescribed under authority granted by law are essentially these:—

1. The entire herd must be submitted for examination and test at such times as are considered necessary by state or federal officials.

2. No cattle shall be allowed to associate with the herd unless such cattle have passed an approved tuberculin test.

3. All milk or other dairy products fed to calves shall be from cows which have passed an approved tuberculin test or shall be pasteurized to render germs harmless.

4. There shall be a thorough cleaning and disinfection of premises where tuberculosis is found and the premises shall be kept in reasonably good sanitary condition.

It is contemplated by the law that the owner will continue these measures indefinitely under penalty of forfeiting his rights to indemnity and test. The law provides that the state will make the tests free of charge to the owner until the herd passes two tests without reactors and is accredited, after which time the owner must pay the expense himself.

This all means, in a nutshell, that under our present law the herd owner enters into agreement with the live stock department to start a procedure on his farm which it is believed will rid his live stock of tuberculosis and he agrees to continue this indefinitely if he is to receive state assistance.

The state has entered into cooperative arrangements with the federal bureau of animal industry under which a generous portion of the expense of testing, of supervision and indemnity is paid by that bureau. In the year closing June 30, 1920, the federal bureau expended \$99,204.12 in Vermont. The state expended its appropriation of \$100,000 and \$66,000 in round numbers, which came from salvage. The grand total of expenditures from all sources was \$265,269.77.

The acceptance of this plan on the part of the farmers of Vermont has exceeded all expectations. On December 31, 1920 we had under supervision 2,161 herds comprising 38,839 cattle, or about 10% of the state's total. On April 1, 1920 Vermont ranked second only to the state of Minnesota in number of herds under supervision and at this time we had herds enough on our waiting list so that we could have led even Minnesota if we had had funds to enable us to do the work promptly, although Minnesota has over five times the number of cattle that there are in Vermont. I think I may say without fear of contradiction that Vermont in proportion to her size leads all the states in efforts to control bovine tuberculosis.

PROGRESS MADE.

It seems to me to be indicative of progress in control of tuberculosis that of the 2,161 herds we had under super-

vision on December 31, 167 herds are accredited as tuberculosis-free; 1,426 or 66% have passed one test without a reactor and probably are practically free, while in 568 herds reactors were found and the process of cleaning up is not completed.

I would not, however, leave the impression with you that there may not be outcropping reactors among the herds which have passed one free test or even among the herds which are fully accredited. Among herds where numerous cases of tuberculosis have been found, I believe this will be the case. It is entirely reasonable to suppose that in herds where infection has been marked many animals may have contracted the disease and have gotten the better of it temporarily by encapsulating or walling in the lesions, just as human beings apparently recover from tuberculosis. In this condition an animal may not react, but at some later time, when the physical condition of the animal is lowered, the parasite again gets the better of it, the disease becomes active and the animal reacts. This is the reason why owners should make tests at least annually and why owners of clean herds should use the greatest care in buying animals to add to their herds only from herds which have a reasonably good tuberculosis-free history. We have found also that the old standard subcutaneous test is not infallible. In herds which have been tested for a number of years an apparent immunity develops. Some animals do not react and are left to do damage in the herd. We are striving to overcome this difficulty, and with apparent success, by using the ophthalmic, or eye, test, and the intradermal, or tail, test, to check the subcutaneous. We are also having difficulties with what are called no-lesion cases, or cases where the veterinarian can find upon slaughter of the reacting animal no visible lesions of disease. It is perfectly natural that owners of such animals should feel that a mistake has been made and that the animal should not have been slaughtered. Post-mortem examinations, however, carried on in an abattoir are made by an inspector of the federal bureau of animal industry for the purpose primarily of determining whether or not an animal has too much disease to render it unfit for human food. Dr. C. C. Conley at the rendering company, where our reactors are slaughtered, takes especial pains to make the most careful research that his time and facilities will permit. It is considered at Washington that we have the best post-mortem work in the country. However, I believe an animal may have tuberculosis in an incipient form so that it will give a reaction and yet the disease may not be so far advanced that it will show in the tissues.

Furthermore, the lesion may be in an obscure part, in the bones or joints where it escapes detection. Some states have enacted laws providing that a reaction is proof that an animal has tuberculosis and post-mortem evidence is not required to confirm the test. I believe there are many reasons why we might take the same position.

It is my observation from four years of experience as live stock commissioner that the tuberculin test is 98% efficient and that while we have a few baffling cases, the great majority of herds will become free from tuberculosis in a few years if our present rules are scrupulously followed.

I have referred to the fact that our dairymen have come forward in large numbers and willingly signed agreements to enter into partnership with the state and federal governments to produce and maintain tuberculosis-free herds. From the number of applications which we had in the years 1917-1918 I made an estimate that an annual appropriation of \$100,000 would, together with funds from federal sources and from salvage, meet the demands of our dairymen for tuberculin test expense and indemnity. The revision of our laws, however, making indemnity for private tests conditional upon whole herd tests immediately created a new condition. Dealers began to raise the question when purchasing an animal, "Is it tuberculin tested? Will you take back the animal if it reacts?" Owners of tested herds, too, were constantly searching for additions to their herds among herds which had been tested and no reactors found. Buyers from other states were also inquiring where tuberculosis-free cattle could be found. The net result has been to make a difference in value between tested and non-tested cattle, which is a great factor in encouraging tuberculin testing. Our State Board of Health has been very active in encouraging local communities to clean up their milk supplies. The campaign of education which has been carried on through a quarter of a century is also bearing fruit. The net result of all these factors has been a literal avalanche of applications for tests. The fiscal year of the state, as you perhaps know, ends June 30th. Appropriations made by the legislature of 1919 are supposed to carry departments until June 30, 1921. On March 5, 1920 we had applications on hand for testing 796 herds comprising 12,439 cattle. According to our estimates, based on experience, this number, if the average number of tubercular animals were found, would use not only the appropriation for the year ending June 30, 1920 but also that of the next year, ending June 30, 1921. Applicants for tests after March 5, 1920 were informed that they would probably have

to wait until after July 1, 1921 for tests because we had no right to involve the state beyond the sum appropriated by the General Assembly.

Our estimates, however, proved in fact not to be correct. On December 31, 1920 we had left 129 of the herds for which applications had been received prior to March 5, 1920, together with retests of old herds, with a balance left of our appropriation of but \$6,735.28. We had in addition applications for testing 876 herds made after March 5, 1920. In summary, we have our retests to make and have on our books applications for 1,005 herds comprising 11,621 head of cattle.

FUTURE POLICY.

The situation in Vermont to-day, I think, is about as follows:—

1. We have a plan based on the laws of the state and in conformity with the rules adopted by the United States Live Stock Sanitary Officials and the United States Bureau of Animal Industry, which we believe, if followed scrupulously by a breeder, will free his herd from tuberculosis.

2. Vermont dairymen are ready to submit their herds under this plan as rapidly as the work can economically be done.

3. The question is, shall the state provide the live stock department with funds necessary to meet the demands of breeders for this work promptly as applications come in, in the hope that the herds of the state may ultimately be freed from this disease and the expense cease, except for supervision.

An answer to the question of future policy demands a consideration (a) of expense involved and (b) benefits to be derived from such expenditures.

I realize, as I know you do, that exact determination of the expense involved in eradicating tuberculosis from the herds of the state is impossible and must be simply an estimate. However, from experience with all classes of herds, some of which showed no reactors in first test, some of which showed few reactors and others of which showed a large number, I am convinced that we may expect to find 12% of our cattle tuberculous in putting herds through the process which leads to accreditation as tuberculosis-free. The United States census of 1920 shows 435,480 head of cattle in the state, valued at \$28,502,803, or an average per head of \$65.45. A very conservative estimate would place 35,480

on the free list as a result of work already done. This would leave 400,000 head yet to be tested. Estimating reactors at 12% would give a total number of reactors of 48,000. During the year from July 1, 1919 to June 30, 1920 the average net cost to the state for indemnity for reactors was \$31.50. Reactors during this period comprised a larger percentage of pure-breds than will follow in the future, because of the large percentage of pure-breds already tested. Cattle values were materially higher during this period than they will probably be in the future. Taking these things into consideration, providing our present arrangements with the federal bureau of animal industry hold, our net average indemnity cost of these estimated 48,000 reactors will probably be about \$25.00, or a total of \$1,200,000. Add to this the expense of testing and of supervision, and the expense will probably total \$1,500,000.

At the rate applications have been received during the last biennial period, I estimate that it will require an annual appropriation of \$250,000 to enable the department of agriculture to meet the demands of our farmers for tuberculin tests. I deem it my duty as commissioner to ask the legislature for enough money to promptly meet the demands made upon the department, and accordingly, I have included that sum in my budget estimates. An appropriation of \$250,000 annually for six years would, in my opinion, enable us to get the better of bovine tuberculosis in Vermont. Perhaps it will take a little longer. Much will depend upon cattle values and percentages of reactors found.

I am aware that the program I have outlined involves a very large sum of money. What shall we get from its expenditure? The benefits are two—safety to public health and economic gain. It now seems to be pretty generally conceded by the medical profession that bovine tuberculosis can be transmitted to humans, especially to children. This view is clearly set forth in the following extract from a letter which I have received from Dr. William C. Woodward, Health Commissioner of the city of Boston, which is our principal market for milk:—

"It has been established, it seems to me, that bovine tuberculosis is communicable to man and that it is certainly responsible for a very large part of the tuberculosis of bones and glands that occurs in the human race. It is commonly believed that bovine tuberculosis is responsible for but little, if any, of the pulmonary tuberculosis that is so common, but certainly the last word has not been said upon this point, and future research may compel us to revise our judgment even with respect to the relation of bovine tuberculosis to this form of the disease in humans. The bare prevention of bone and glandular tuberculosis alone, however, would amply justify any measures that might

be adopted for the elimination of tuberculosis from the dairy herds of the country, and I personally have a very strong impression that the work that has been done along that line, plus the general pasteurization of milk, has accomplished something toward that end.

"I am not ignorant of the argument that is sometimes advanced, that so long as pasteurization of milk is insisted upon, the elimination of tuberculous cattle from dairy herds is not necessary; that is, that pasteurization should be relied upon to destroy infection. Such a course of logic would lead, of course, to the continuance in the dairy herds even of cows with tuberculous udders, and would justify or excuse the continuance in active dairy work of persons suffering from scarlet fever, diphtheria, and typhoid fever. Certainly such a course is unthinkable. Pasteurization will be necessary in any event, because the elimination of tuberculous cows from dairy herds will not do away with the danger of infection from other sources, such as from persons having typhoid fever, scarlet fever, and diphtheria. But in view of the weakness of human nature and of the difficulty of absolutely insuring the proper pasteurization of the entire milk supply of any large city, pasteurization must be fortified by the elimination of patients suffering from typhoid fever, from scarlet fever, and from diphtheria, from the dairy farms, and in the elimination of cows suffering from tuberculosis."

While pasteurization may in a measure protect the health of consumers of milk in large cities like Boston and New York, conditions in the small towns and cities of Vermont are such that pasteurization of our local milk supply is impossible and for this reason the protection of the public health demands that we prosecute a vigorous campaign to eliminate tuberculosis from our herds.

The trend of large city health regulations seems to be, not to depend upon pasteurization alone. A recent issue of Hoard's Dairyman carries a news item relating to legal action brought by a milk company against Dr. W. C. Fowler, health officer of the District of Columbia, because of his refusal to grant licenses to New York herd owners to ship milk to Washington because these herds were not accredited as tuberculosis-free. It is my firm opinion that nothing we could do would make so insure a market for our dairy products in the trying years ahead of us as to be able to advertise that our herds are tuberculosis-free.

Dr. Woodward, in his letter to me, also brings out an important point on the economic side. He says:—

"Incidentally, if I may be allowed to venture an opinion, the adoption of the universal tuberculin test will not tend to decrease the milk supply of the country, but rather to increase it and to cheapen it, since a healthy cow may be expected to yield during its milking life a larger volume of milk for a given amount of labor, housing, and care, than can a cow infected by tuberculosis. The market value of the offspring of herds free from tuberculosis must be reckoned with, too, as an additional factor in increasing the balance that will ultimately stand on the credit side of the ledger as the result of universal tuberculin testing."

The effect of ill health upon production is all too apparent to those who have had an opportunity to see herds in which tuberculosis had developed to its advanced stages.

Vermont is a breeding state to which herd owners in states farther south look for cattle with which to replenish their herds. If instead of sending out damaged goods, we can in a few years attain a position where buyers have confidence that they can come to Vermont and purchase cattle free from disease, our market for cattle and the prices paid for them will amply reward us for the expenditure.

Therefore, from considerations of public health and from considerations of policy in the economic development of a great industry from which a very large proportion of our people get their living, I believe we cannot afford now to turn back in our policy of tuberculosis eradication, but that there is every reason to justify our going forward in the prosecution of our work in tuberculosis control until our herds are freed from this disease.

DAIRY CATTLE BREEDING.

ANDREW A. BORLAND, PENNA. STATE COLLEGE.

The success of a manufacturing plant depends in a large degree upon the efficiency of the machines which it employs. A dairy cow may be likened to a milk making machine and the financial success of the owner of a number of these machines will largely depend upon the selection of such animals as will give a maximum yield of milk and butterfat with a minimum outlay for feed and labor.

GOOD COWS.

The importance of high producing cows may be seen from the following data recently completed in Pennsylvania. The data includes records from 1,400 cows. These cows were classified according to production. Those yielding less than 150 pounds of butterfat formed one class. Those yielding from 150 to 200 pounds butterfat formed the second class, and so on with an increase of 50 pounds of butterfat for each class until the highest class was reached including cows that yielded 400 pounds fat or over.

Table I. The Relation of Yield to Profit and Feed Cost of Milk Production.*

Average Production per cow		Average number cows	AVERAGE PER COW PER YEAR																			
			Pounds of milk	Pounds of fat	Price of product		Value of product		Cost of roughage		Cost of grain		Total cost of feed		Value of product above feed cost		Returns for \$1 expended for feed		Feed cost per cwt. milk		Feed cost per pound fat	
From	To				Milk per . . .	Fat per lb.	\$	c	\$	c	\$	c	\$	c	\$	c	\$	c	\$	c	\$	c
150	fat or less	58	3554	129.9			68.01	30.62	13.43	44.05	23.96	1.54	1.23	.33								
150-200		250	4838	177.2			94.63	30.25	18.38	48.63	46.00	1.94	1.00	.27								
200-250		435	6104	225.5			122.71	31.00	24.89	55.89	66.82	2.19	.91	.24								
250-300		362	7135	275.8			150.58	32.21	31.18	63.39	87.19	2.37	.88	.22								
300-350		197	8080	321.2			157.71	33.71	33.49	67.20	90.51	2.34	.83	.20								
350-400		60	8940	371.0			173.05	35.59	38.45	74.04	99.01	2.33	.82	.19								
400	Lbs. and over	36	10939	441.0			201.70	40.78	46.25	87.03	114.67	2.31	.70	.19								

*Compiled by Le Roy Hoffer.

The data show that there is a marked increase in the profits and a marked decrease in the feed cost of milk and butterfat production as the yield per cow increases. Cows producing less than 150 pounds butterfat yielded products to the value of \$68.01, while cows producing 400 pounds butterfat gave products valued at \$201.70. The low producing cows ate less feed than the high producers, the 150 pound cows consuming \$44.05 worth of feed, while the 400 pound cows ate \$87.03 worth of feed. However, after the feed bills were paid it was found that the lowest producing class had only \$23.96 left per cow for the owner. There was a constantly increasing return above feed cost as the production increased and when the 400 pound class was reached the value of the product above feed cost was \$114.67 per cow.

The advantage of high producers in lowering the feed cost of milk production may be noted by the fact that the 150 pound class ate \$1.23 worth of feed to produce 100 pounds of milk. The feed cost per 100 pounds of milk gradually decreases as the production increases, so that by the time the 400 pound class is reached the feed cost of producing 100 pounds of milk is but \$.70. Likewise the feed cost of one pound of butterfat with cows producing less than 150 pounds is \$.33 while with cows yielding over 400 pounds it is only \$.19. Good cows then are the first essential in successful dairying. What Vermont needs is not more cows but better cows.

High producing cows are found to be the more economical producers when total cost of milk production records are kept.

The following table including records of 1,800 cows ending their year's work during 1918-1920 sets forth the facts.

Table II. Relation of Milk Yield to Total Cost of Milk Production.*

1890 Cows on 142 Penn'a Farms, 1918-1920.

Yearly Production Per cow	No. of cows.	Grain Cost	Rough- age cost per cow.	Feed cost per cow.	Labor cost per cow.	Over- head Ex- penses per cow.	Current Expenses per cow.	Total cost	Credits per cow.	Net cost per cow.	Net cost +10% for manage- ment.	Cost to produce 100 lbs. milk.	Cost to produce 1 qt. of milk.
3000-4000 lbs. of milk	33	\$ 19.66	\$ 64.48	\$ 84.14	\$ 44.12	\$ 38.79	\$ 19.93	\$186.98	\$ 19.51	\$167.47	\$184.21	\$ 5.15	\$.11
4000-5000 " "	123	38.33	45.12	83.45	72.85	32.51	26.72	215.53	21.00	194.53	213.98	4.61	.099
5000-6000 " "	476	49.66	51.18	100.84	68.40	33.26	29.25	231.75	23.06	208.69	229.55	4.09	.0879
6000-7000 " "	572	55.07	52.66	107.73	78.46	32.82	30.53	249.54	23.47	226.07	248.67	3.84	.0825
7000-8000 " "	382	68.99	58.03	127.02	77.93	34.74	35.98	275.67	31.33	244.34	268.77	3.58	.0769
8000-9000 " "	170	70.68	63.14	133.82	83.71	42.10	32.65	292.28	29.12	263.16	289.47	3.41	.073
9000 lbs. milk and over	46	81.49	73.29	154.78	56.75	36.79	47.63	295.95	31.40	264.55	291.00	2.89	.062

*Compiled by Le Roy Hoffer.

The table shows that it costs less to keep a poor cow than a good one but the latter produces so much more milk that she is really the more economical of the two. With cows producing 3,000 to 4,000 pounds of milk the total cost per 100 pounds was \$5.15 while with cows producing 9,000 pounds or over the total cost per cwt. was only \$2.89. The 3,000-4,000 pound cows charged their owners 11c to produce a quart of milk while the 9,000 pound cows charged but 6.2c.

The total cost of producing one pound of butterfat has also been computed for 1,800 cows on 142 farms. These cows were again classified according to butterfat production beginning with cows yielding less than 150 pounds of butterfat and each succeeding class being 50 pounds higher in production, until the class producing 400 pounds is reached.

Table III. Relation Butterfat Yield to Total Cost of Butterfat Production.*

1800 Cows on 142 Penn'a Farms, 1918-1920.

Yearly Production per cow.	No. of cows.	Grain cost per cow.	Rough- age cost per cow.	Feed cost per cow.	Labor cost per cow.	Over- head Ex- penses per cow.	Current Expenses per cow.	Total cost per cow.	Credits cost per cow.	Net cost per cow.	Net cost +10% for manag- erial Ex- penses.	Cost to Produce 1 lb. of fat
Less than 150 lbs. fat.	16	\$28.02	\$50.18	\$78.20	\$43.08	\$15.69	\$22.00	\$158.97	\$21.65	\$137.32	\$151.05	\$1.09
150-200 lbs. Fat.	245	35.45	48.77	84.22	62.03	37.27	27.92	211.44	21.27	190.17	209.18	.92
200-250 " Fat.	761	52.73	52.23	104.96	71.46	31.06	29.23	236.71	24.19	212.52	233.77	.81
250-300 " Fat.	477	66.08	55.78	121.86	82.21	38.37	34.87	277.31	31.46	245.05	270.43	.77
300-350 " Fat.	261	71.70	61.75	133.45	86.76	37.48	36.41	294.07	24.07	270.00	297.00	.75
350-400 " Fat.	22	67.61	82.30	149.91	51.84	40.71	37.34	279.80	21.97	257.83	283.61	.58
400 lbs. Fat and over.	20	88.69	60.64	149.33	44.64	27.91	32.48	254.36	20.90	233.46	256.80	.41

*Compiled by Le Roy Hoffer.

The foregoing table again shows the advantage of high producing cows. The total cost of producing a pound of butterfat with cows yielding less than 150 pounds per year is \$1.09 and but \$.41 with cows producing 400 pounds and over.

PURE BREDS.

Pure bred dairy cattle are more profitable even for milk and butter production than are grades or scrubs. In table I, 61% of the cows producing over 400 pounds of butterfat yearly were pure bred animals. The following table compiled from the records of the Center Square Cow Testing Association of Pennsylvania brings out the advantages of pure bred animals as producers.

Table IV. Relations of Breeding to Profit.

	Pure Bred	Grade	Mongrels.
Cows in Association	84	49	82
Did not pay for feed	2		13
Made less than \$25 profit above			
feed cost	4	5	26
\$25-50 profit above feed cost	19	18	28
\$50-75 profit above feed cost	29	18	13
\$75-100 feed cost	14	8	2
Over \$100 feed cost	16		

The table shows that while there were two pure bred cows that did not pay for the feed they ate, there were 13 scrubs that did not pay for their feed. As the scale of profits above the feed cost increases the proportion of pure breds increases, so that when the group of cows producing over \$100 profit above the feed cost is reached, there are 16 cows, every one of which is a pure bred animal. In addition to their advantage from the milk and butterfat production standpoint, these pure bred cows are much more valuable for breeding purposes.

SELECTION.

Having decided that pure bred animals are preferable even for milk and butter production, the next question is to decide how to secure such a herd most quickly and economically. Usually the best method is to purchase one or two pure bred animals and gradually develop a pure bred herd from this modest beginning. Five things must be kept in mind in selecting the animal. Type, Production, Ancestry,

Health and Price. The animals should have large feed capacity, straight top lines, well balanced shapely udders and prominent milk veins; they should have high producing ancestry; should be tuberculin tested and from herds that are free from contagious abortion; the market price for this sort of foundation stock is higher than for inferior pure breds but even at the higher price the superior animals will be found to be the cheapest in the long run.

Yearly records of production are of especial importance in indicating the producing ability of the animal. In this connection cow testing association records are extremely valuable. The following data from a cow testing association record will illustrate the point.

Table V. Yearly Record of a Herd of Sixteen Cows.

No. of cows.	Lbs. milk during testing period.	Lbs. fat during testing period.	Value of product.	Total Cost of Feed.	Profit above Feed Cost.	Loss.	Returns for \$1 expended for feed.
1	5388	196	62.94	68.73		5.79	.92
2	6947	222	70.92	70.24	.68		1.01
3	2795	157	52.31	66.23		13.92	.79
4	5009	214	69.74	68.47	1.27		1.02
6	6691	240	76.11	70.94	5.17		1.07
8	7235	246	78.61	72.05	6.56	3.31	1.09
9	3885	188	62.92	66.23			.95
10	4230	156	49.06	65.95		16.89	.74
12	8157	319	107.91	74.37	33.54		1.45
13	6733	237	76.38	69.82	6.56		1.09
14	5112	204	65.32	69.32		4.00	.94
15	8126	262	83.45	68.73	14.72		1.21
16	6857	301	97.32	68.73	28.59		1.42
17	5111	202	65.94	74.37		8.43	.89
18	5034	212	72.37	71.65	1.72		1.01
19	4793	203	68.68	70.52		1.83	.97
Av.	5757	223	72.50	69.77	2.73		1.04

The table shows that seven cows in this man's grade herd were not paying for their feed. This man could have kept his two best cows and made considerably more from these two alone than he now makes from his entire herd of sixteen cows. Had he sold his nine poorest cows he would have made nearly twice as much from the remaining seven as he now makes from the whole herd. Who would want to buy cows from a herd of this sort? Beware of buying cows at any time without a knowledge of their yearly production.

THE SIRE.

After the dairymen has selected *good* cows from which to raise more efficient animals, he must mate these cows with a still better sire in order to insure success. The breeder's progress will be governed almost entirely by the excellence of the sire he uses. Excellence of type, high records of

production in the ancestry, and freedom from disease are the fundamentals to be kept in mind. It goes without saying that a breeder cannot afford to use anything else but a pure bred bull of the same breed as his cows.

The importance of high records of production in the immediate ancestry may be seen from the following data from the Ohio Experiment Station.

TABLE VI. INFLUENCE OF SIRE.

	Milk	Lbs. Butterfat
Average yield Dams all Lactations	7392	231
Daughters, Sire A, Ancestors good records	8568	273
Increase due to Sire A	1176	42
Daughters, Sire B, Ancestors high records	11599	384
Increase over original dams	4207	152
Group No. 2.		
Average yield Dams all Lactations	5275	287
Daughters Sire C, Ancestors no records	4588	248
Decrease due to Sire C	687	39
Sire D. High Producing Dam, Imported Sire		
Increase daughters over dams, Sire D	752	32

OHIO EXPERIMENT STATION.

Sire A as shown by the table increased his daughters' production 1,176 pounds of milk and 42 pounds of butterfat. The significant fact is that the ancestors of Sire A had *good* records of production. Sire B, whose ancestors had *high* records of production had still greater influence in increasing the production of the herd, his daughters exceeding the records of the original cows by 4,207 pounds of milk and 152 pounds of butterfat.

In group two Sire C was supposed to be a good bull since he came from one of the best herds in the state. His dam however, had *no records* of production. Such a bull is always a gamble. He may grade the herd either up or

down. This particular bull graded the herd down since his daughters were not as good as their dams by a margin of 687 pounds of milk and 39 pounds of butterfat. Sire D was then secured from a *high producing* dam. His daughters have been better than their dams by a margin of 752 pounds of milk and 32 pounds of fat. These results show the great importance of good records of production back of the sire.

CO-OPERATIVE BULL ASSOCIATIONS.

A sire of excellent type backed by high records of production and from a disease free herd costs a considerable sum of money, so much in fact as to be beyond the financial reach of the average dairyman.

The best method of securing the use of a high class sire at moderate cost has been found to be the co-operative Bull Association. These organizations are formed by a number of dairymen in a certain district or county, including several communities. The members purchase co-operatively good pure bred dairy bulls of a certain breed and place one in each of the several communities, or blocks of the association. The bulls are rotated every two years so that each bull is used for several years.

By this method the members may secure the use of bulls with exceptional breeding and individuality at a low cost. The shares usually sell for \$15.00 each. A man having 10 cows would thus invest \$150.00. For this sum he would have the use of four thousand dollar bulls for a period of eight years provided there were four blocks in the Association. There are twenty-one of these associations in Pennsylvania at present using ninety-eight bulls ranging in value from \$275.00 to \$2,500. They are doing a splendid work for the dairy breeders of the state and I believe Vermont dairymen might do well to give increasing attention to the organization of more of these associations.

The selection of pure bred high producing cows of good type as foundation stock; constant attention to records of production as a basis for culling the herd; and the use of a high class pure bred sire to be obtained at reasonable cost through the medium of the Co-operative Bull Association are a triple alliance that should do much in the improvement of dairy cattle in Vermont.

Members of the Dairymen's Association were the recipients of a genuine treat at the hands of The Worcester

Salt Company, (through its genial and always present representative Mr. McGaffey) in the form of a roast duckling dinner, served at Hotel Vermont Wednesday evening, followed by an interesting entertainment by Bennett Springer, conjurer and cartist, which was interspersed with orchestral music and singing. At the close of the evening's delightful entertainment, the guests put on record their appreciation of the same by a rising vote of thanks in behalf of the Worcester Salt Company and Mr. McGaffey.

Following the dinner and preceding the entertainment, Professor W. P. B. Lockwood, of the Massachusetts Agricultural College (Amherst) and connected actively with the New England Dairy and Food Council, spoke as follows:—

Mr. President, Ladies and Gentlemen:—

The purchaser of milk and dairy products, when his bills come in, is much like the little boy who asked his mother, "Did father's father spank him with a slipper"? Answer, "Yes". "Did his father spank him with a slipper"? Answer, "Yes". "Did his father spank him with a slipper"? Answer, "Yes". "I wonder who started this game anyway". The purchaser wants to know who started the game and why it has kept up so long and so high.

The dairy industry has accepted what Providence has provided for it, in the way of people liking milk and dairy products, and in this way alone taken nearly 20 per cent. of the money spent for food. On the other hand, if it had gotten behind its own goods and shown their real merits, it might have had much more.

The real advertisers of milk to-day are those people who are dealing with under-nourishment in the schools and other places. They have found that they can not correct under-nourishment or malnutrition without talking food. Further, you can not talk food for children without talking about milk. About the only other business that has the same advantage in the schools is the tooth paste and tooth brush people. The dairy industry as an industry has spent little in advertising, the dealers doing practically all of it and the farmers or actual producers practically nothing.

Some facts relative to the Boston market might be enlightening and interesting.

The Railroad Commissioner's reports show that during the year 1919 336, 946, 456 pounds of milk and cream were

brought into Boston by rail. This was an increase of 28.7 per cent. over the amount brought in during 1916, and 46.9 per cent. more than was brought in during 1913, according to the same reports. In 1916 the high price of milk retail was 9c per quart; in 1919 the high price was 17c, or an increase of 88.8 per cent. The lowest price retail in 1919 was 15c, which price lasted two months.

The best figures obtainable show a decrease of use of condensed milk.

Dr. Jordan's reports and information coming from three concerns only indicate that milk powder with a liquid milk equivalent of 11,747,000 pounds was distributed through the Boston market. This was an increase of 34 per cent. over 1916.

Oleo sold through the Boston market was 2,706,400 pounds, or an increase of 120 per cent. for the four years.

During this time several agencies have helped.

a. The regional Milk Commissioner's findings and prices set by them gave the public more confidence in the business.

b. The Agricultural College and the U. S. Department of Agriculture had special workers on milk and dairy products.

c. The Food Administration backed an advertising campaign that was financed by distributors and producers, spending \$11,000.

d. The Boston Milk Campaign was put on at a cost of \$36,000 on advertising and milk educational work.

e. During all of this time there was no unfavorable comment or derogatory outbreak of the press relative to the business.

The work of the Boston Milk Campaign stopped on account of lack of support and organization.

A few figures on populations may be of interest. In New England north of the Massachusetts northern boundary there are in round numbers 1,563,000 people or 30 per square mile. South of this line in New England there are 5,836,000 people, or 383.2 per square mile. Outside of the district around New York City this is the most densely populated area of its size in the United States; 5.52 per cent. of the population of Continental United States are centered here on 48 | 100 of 1 per cent. of the area. The ten northeastern States, New England, New York, Pennsylvania, New Jersey and Delaware, have nearly 27 per cent. of the population of Continental United States located on less than 4 per cent. of the area of Continental United States.

The above shows that the dairy production in New England must necessarily be largely above the northern Massachusetts line and the consumption south of this line. This makes it a sectional or regional business rather than an individual State business.

With this in mind and the breaking down of the Boston Milk Campaign, it was felt by those interested that some organization should be created that would work as a general New England organization and at the same time save the good results obtained from the work of all interests previously done. The work is reorganized under the name of the New England Dairy and Food Council, incorporated under the laws of Massachusetts as a non-stock, non-profit corporation with the following purposes:

(ARTICLE II, SECTION 1.)

a. "To collect and disseminate information relative to the food value, health value, and economy in the use of milk and dairy products, and of other food products.

b. "To collect and disseminate information concerning the production, distribution and consumption of milk and dairy products, and of other food products.

c. "To encourage and promote a sound dairy industry, to insure an adequate and satisfactory supply of milk and dairy products and of other food products for New England."

In order that there might be a definite basis for working, the following statement of policy was made:—

"WHEREAS, data collected by health authorities, the United States Department of Agriculture and Labor and others interested in children and school work shows

1. "That there is a large amount of undernourishment in school children varying from 10 per cent. to 40 per cent.;

2. "That it is found among country children as well as city children;

3. "That it is found in all classes—in the families of

produce better nutrition, promote health, help in more economic living and at the same time help New England's greatest single agricultural industry,

"Therefore, we propose to present to the public through dietetic and other qualified workers and through direct publicity the facts relative to the use of milk and dairy products.

"In this work it will be the aim of the New England Dairy and Food Council to publish material which meets the approval of Federal, State and local authorities regarding food values and health, and in no case to put out matter under the name of a cooperator with his approval."

On the board of directors there will be represented the producers, dealers, manufacturers, State Commissioners of Agriculture, State Agricultural Colleges, State Boards of Health and consumers or public citizens. The movement has the support of the above, along with that of the New England Milk Producers Association, the United States Department of Agriculture and the National Dairy Council. Your own Commissioner Brigham is one of our directors.

The Council will act as the overhead organization, secure money and help to organize the work. It is proposed that the work be done by Milk Educational Committee rather than by campaigns.

The Health and other authorities would like to do the work but do not have and can not get funds for it. It would seem that it is up to the business that gets the benefit to supply the financial support. The work will be done through the schools, welfare organizations, child welfare associations, women's clubs, parent-teacher associations, Dietetic Bureau, talks in factories, stores, etc., and direct advertising. During the Boston Milk Campaign the following was done:—

FIRST.—Educational work in schools.

663 talks were given; 157,000 reached.

Milk Fairy Play given 70 times; 30,000 children saw it.

Educational work—clubs, factories, stores, etc.—246 talks given; 55,000 adults reached.

It is impossible to talk health in the schools without talking food, and one can not talk about food for children without talking milk and dairy products. Not only the actual protein and energy value but the lime for making bone and teeth and the growth promoting and health promoting elements, vitamins, are found more plentiful in milk and dairy products than in other foods.

A survey made of the milk drinkers and non milk drinkers by the doctor in charge of the schools in Los

Angeles, California, shows that the milk drinkers got through with the eighth grade much earlier than the non milk drinkers.

One teacher in Boston stated "that this was the first year she did not have an anemic child in her room, they all drink milk".

Another said "that the boys who drank milk went through the baseball season without losing weight, while those who did not drink milk lost".

Numerous other illustrations could be cited. Very interesting results come from the work in the schools. Competitive essays on milk written by the children showed plainly those who had listened to milk talks and those who had not. One boy said, "Benny Lennard the prize fighter drank three quarts of milk a day so he drank milk." Another boy said "the cow gave juicy, tender milk". Others gave the real reasons as told them by the teachers.

In one factory where milk talks were given, it was found that one year later they were using 700 per cent. more milk than before the talks were given. In Springfield the manager of one plant felt that it paid to have a mid-morning milk service cart go through the plant, the operator being paid by the company.

SECOND.—Newspapers, car cards and movies are used.

During the Boston Campaign 14 papers with 204 insertions were used.

4 car cards, one each month.

261,000 pieces of literature, posters, etc., were distributed.

A Milk Conference was held, the best speakers available were used and teachers and all others interested invited.

With the work as at present organized, the dealers themselves in the Boston market will do the newspaper advertising and the Council will do the educational work.

The movement must be financed and should be financed by those receiving the benefits—namely, the dealers, manufacturers, and producers. A schedule has been arranged, the dealers to put in $\frac{1}{2}$ cent per 100 pounds of milk purchased, the producers to put in $\frac{1}{2}$ cent per 100 pounds of milk sold, all to be collected through the dealer and both sent to the Council. In this way every dollar works and a large percentage of it is not eaten up by collection charges. The cream and butter manufacturers' assessment is 1 | 10 cent per pound of fat purchased and the producer of this 1 | 10 cent per pound sold. Let us see what this means. It means 25c per cow per year on the basis of 5,000 pounds

milk production for the milk producer. Ten cows would cost \$2.50 for advertising, and let me say that this is just as legitimate a charge as anything else.

By the way, it might be interesting to see what the producer has actually been doing for his own business in this line. From what I have been able to find out, there is as much, if not more, under-nourishment in the country schools as in the city schools. The farmers are not giving their children the milk and dairy products they should. Mr. Camburn, formerly of the University of Vermont, was interested in this and told me that he went to one of the good dairy sections of Vermont and on inquiry found that butter was sold in that community when the summer boarders were there but not the balance of the year; that the farmers were not supporting their own industry but were supporting the oleo and margarine industry (the greatest enemy of the dairy business) with the money they secured from their industry and then wondered about it. Producers,—the city people to-day are supporting your industry better than you yourselves are. An oleo man told a friend of mine at the National Dairy Show in Chicago this last fall that their business had grown very rapidly, that their increase had been largely with the farmers and teachers. The margarine people have been heavy advertisers and some of the advertising has been—well, to say the least, very misleading.

California, Iowa, Michigan and Wisconsin are doing this same type of work that the New England Dairy and Food Council propose to do, while others are just organizing. Those interested in the Philadelphia market are organizing on the basis of one cent per 100 pounds of milk on a \$60,000 project for this same type of work. The National Dairy Council has pledged for \$100,000 this year. We have been assured that some of this money will be available for work in New England.

The Boston distributors have signed contracts for their $\frac{1}{2}$ cent per 100 pounds of milk bought. Some of them are sending out to get authorization from their producers to take the same amount from their producers' checks. If you get these, sign them so we can get the money to work with. If they don't send them out, write and ask them why. This is your business, the largest agricultural industry in New England. Get behind it on this movement and let us see if we can not hold all that we have gained and make it better.

Thank you.

THURSDAY FORENOON SESSION.

Extension Dairy Specialist of the cooperative Extension work for the State of Vermont, John A. Hitchcock, was requested by Dean Hills to say a word regarding the care and feeding of the cow Tilly Alcartra. He responded as follows:

I am given a difficult topic for the simple reason that there is nothing to tell. There probably has never been any cow that has given as little trouble to her caretaker as "Tilly". In fact, she must have, I think, a cast-iron stomach for it seems to be impossible to get her off feed. I recall on one occasion she got out of her pen and into the feed alley and filled up on ground barley. Needless to say when I came down the next morning and found her there I was somewhat disturbed, but "Tilly" seemed none the worse for it. She simply skipped her next feed and then went right on "sawing wood", with her appetite as good as ever. If I may draw a moral from the story of this cow—and I suppose no story is complete without a moral—it is this: Give your cows a chance to see what they can do.

"Tilly" was purchased as a two-year-old heifer by the Morris corporation for \$300. but last June a bull calf from her, sired by Carnation King Sylvia, sold at public auction in St. Paul for \$50,000. What was this price based on? Simply the value that had been produced by the advanced registry records which his dam had made.

Of course we can't all expect to raise \$50,000. calves, but by giving our cows a chance to see what they are capable of in official record work, we can very decidedly increase their value and that of their off-spring.

President Harris withdrew appointment made previously of the Chairman on Resolutions Committee, and in lieu thereof appointed John B. Candon of Pittsford.

CONTAGIOUS ABORTION.

DR. E. H. BANCROFT, BARRE, VERMONT.

Contagious abortion, or the abortion disease, with its attendant disasters of abortion, sterility, retained membranes, calf scours and calf pneumonia is, I think, the most serious problem that the dairy farmer has to face,—it is so widespread, manifesting itself in some form or other in a greater or lesser degree of virulency in a very large percentage of the dairy herds of the country.

The cause of contagious abortion is now generally accepted to be the Bang abortion bacillus. The most common avenue of infection is probably by injection of infected material with the food, and also through the genitory tract. Its commonest habitat in the bodies of cattle are the pregnant uterus and the udder. The udder is the organ in which it persists longest,—it may persist here from a few weeks or for seven or eight years. This is a matter of great importance, because cows that are apparently healthy may be spreaders of infection for a long time, even though they themselves show no symptoms of disease, and such a cow added to a susceptible herd might cause an outbreak of abortion disease in the herd even though she herself did not abort.

The uterus does not remain infected but for a very short time after the expulsion of the fetus, but at this time billions of bacilli are expelled from the infected uterus. The abortion bacillus is an obligatory parasite,—it cannot multiply outside the body of its host; it is not a spore forming organism and is not strongly resistant against sunlight and drying, or against germicidal agents.

How are you to know if the infection exists in your herd? If there are several abortions in the herd, or if several cows retain their placenta following apparently normal parturient, or if there are several cases of sterility in the herd, you have every reason to believe that your herd has the contagious abortion disease. It may be so virulent as to amount to a serious disaster to the herd, or of so low a virulency and producing so few symptoms as to cause one to doubt if the disease really exists. A laboratory diagnosis can be made from the blood of an infected cow;—this is quite accurate but does not give one much of an idea of the

virulency of the infection. Calf scours and calf pneumonia are often closely associated with contagious abortion in the herd.

What are we going to do when we find that abortion disease really exists in our herd? Unfortunately there is no remedy that is a specific for this disease. But a great deal can be done by proper herd control, sanitation and intelligent and careful handling of each individual manifestation of the disease in the herd. Fortunately the infected animals, apparently, gradually acquire an immunity against the infection, until after a time it no longer causes any symptoms of disease. It is very seldom that a cow aborts more than twice; a large percentage of the cows that abort do so only once, carrying their calves full time after a single disaster.

A herd composed entirely of immune animals seems to be our greatest hope, after we are sure that the disease is established in the herd. To bring this desired condition about in the shortest possible time, we should cease making any additions to the herd, except those additions be young calves, that will grow up on the milk of the herd, acquiring immunity as they grow. The addition to the herd from time to time of adult susceptible females, is to invite disaster;—it is like continually adding fresh inflammable material to a fire that is smoldering and burning out. A herd that becomes immune to one strain of the abortion bacilli may suffer again if a new strain is introduced to which its members are not immune. So great care should be used to protect them from new infection.

There is on the market a bacterin and also a vaccine which are supposed to hasten the much desired immunity. The bacterin is composed of killed abortion bacilli; they are injected subcutaneously in large numbers at intervals; this treatment can do no harm. I do not think it has been proven beyond a doubt that it does good. The vaccine is composed of large doses of attenuated living organisms. Some good results have been claimed for this line of treatment, but from the fact that they are composed of living organisms, great care and judgment should be exercised in using them. An abundance of sunlight in the stable, good ventilation and sanitation are important factors in overcoming this disease. Retained fetal membranes should be properly handled; some can be removed manually and others should be handled by copious douching with hot normal salt solution and the uterus properly treated until it is normal. This can best be left to the judgment of your veterinarian.

Many cases of sterility yield to proper treatment. These cases also are best handled by a qualified veterinarian. I regret that I have not been able to tell you of some sure and never failing remedy for this disease. Unfortunately I know of none. But let us have courage, for some of the best scientists in the country are working on the solution of this problem, and let us hope that success is not far distant.

**RESOLUTION ADOPTED BY THE VERMONT DAIRY-
MEN'S ASSOCIATION AT ITS 51st
CONVENTION.**

Vermont alone among the States makes no appropriation to its State College of Agriculture for instructional purposes. Its only contribution during two generations has been Morrill Hall. We believe it is high time that the State ceased being a minority of one. We call upon the present State Legislature to heed the suggestion of Governor Hartness and to listen to the insistent call coming from the Vermont creameries. We urge the erection, equipment and maintenance of an adequate dairy building for the College of Agriculture; and we direct our officers to represent us before the State Legislature in behalf of this proposition.

RECEIPTS AND EXPENDITURES OF THE VERMONT DAIRYMEN'S ASSOCIATION, 1920.

W. H. HARRINGTON, TREASURER.

Receipts.

1920.	
Cash on hand	\$ 785.37
State appropriation	1,000.00
For membership fees	118.00
Space sold and for ads.....	518.00
Total receipts	<u>\$2,421.37</u>

Expended as Follows.

Jan.	16	Hotel Vermont	\$ 137.50
	16	Hotel Van Ness	17.95
	16	F. H. Bickford	22.70
	19	W. H. Harrington	33.88
	14	Ellis T. Harrington	14.80
	24	Capital City Press	175.61
	24	St. Louis Button Co.	35.40
	19	O. L. Martin, Sec.	52.66
Feb.	3	L. L. McAllister	10.00
	12	P. W. Harwood	25.00
	13	Orrin Bent, Butter Judge	47.51
Jan.	24	Miss Cecelia Mowsovitz	50.00
Feb.	12	George F. E. Story	44.57
	2	W. P. B. Lockwood	44.14
	14	F. S. Adams	62.64
	2	E. S. Savage	55.56
	13	O. L. Martin, Sec.	29.19
Mar.	26	Miss G. S. Smith	69.03
	30	M. J. Corliss	128.00
Oct.	11	O. L. Martin, Sec., Salary	175.00
Nov.	1	O. L. Martin, Postage and Express	19.74
	22	Amos Eaton	100.00

May 24	Rodgers Engraving Co.	15.24
Jan. 19	A. E. Munsell, Stamped Envelopes	2.16
Mar. 29	Tuttle Co.	2.42
Nov. 2	R. C. Munsell, P. M., Stamped Envelopes.	4.40
	Transferred to Premium Fund.....	195.50
	Cash in Bank to Balance	850.77
	Total expense	<u>\$2,421.37</u>

Premium Fund.

1920.		
Jan. 21	Received for Butter Sold.....	\$ 112.00
	Transferred from General Fund	195.50
	Total	<u>\$ 307.50</u>
	Paid for 153¾ points of butter at \$2.00..	\$ 307.50

DAIRY BUTTER 1921.

M. G. Eastman, Lyndonville	95
H. M. Lee, Windsor	98
Rupert M. Lewis, Woodstock	96 $\frac{1}{2}$
R. E. Burnett, Bethel	92
D. A. Kneeland, Waitsfield	94
George Gebbie, Ryegate	93
F. R. Hawyard, West Fairlee	94
P. B. Swan, Montgomery	92
A. E. Sherburne, North Pomfret	93 $\frac{1}{2}$
A. M. Harrington, North Pomfret	95
E. A. Darling, East Burke	95
Chas. Gates & Sons, North Hartland	92
E. F. Kibby, Randolph Center	93
J. B. Candon, Pittsford	97
Carl C. Johnson, Pomfret	95
L. W. English, Woodstock	94
D. A. Blain, Barnet	95

CREAMERY BUTTER.

H. W. Belden, Waitsfield	94
William O'Brian, Waitsfield	95
S. L. Harris, Proctor	94
F. A. Rist, Wilmington	95
Robert S. Stone, West Hartford	94
H. L. Lyster, Wells River	95
L. A. King, East Corinth	93
C. M. Lilley, Marshfield	93
S. H. Siples, Burlington	95
M. F. Donohue, Essex	93
Granite City Coop. Creamery Ass'n. Barre	97
John Bond, East Montpelier	95
L. W. Williams, North Craftsbury	94 $\frac{1}{2}$
Eugene Beaudette, Addison	92
R. S. Hall, South Hero	96
W. A. Vancour, East Hardwick	93 $\frac{1}{2}$
Plina Douse, McIndoes	93
C. M. Story, Chelsea	97 $\frac{1}{2}$

W. O. Donohue, Moncton	92
C. A. Hastings & Son, Springfield	92
Cabot Cooperative Creamery, Cabot	96
J. F. Donohue, Vergennes	93
J. B. Lucia Jr., Middlebury	95
W. C. Porter, Sharon	96
Tunbridge Cooperative Creamery, Tunbridge.....	95
W. P. Stone, South Strafford	97
Number of entries	43
Highest score	98
Lowest score	92
Average score	94½

ASSOCIATION GOLD MEDAL AND DAIRY SWEEPSTAKES CUP.

H. M. Lee, Windsor, Score.....	98
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CREAMERY SWEEPSTAKES CUP.

C. M. Story, Chelsea, score	97½
Report was accepted and adopted.	

**W. C. FUNK, ASSISTANT FARM ECONOMIST, OF THE
UNITED STATES DEPARTMENT OF AGRICULTURE
FARM MANAGEMENT AND FARM ECONOMICS,
WASHINGTON, D. C.**

FARM BUSINESS ANALYSIS SURVEY.

A Farm Business Analysis Survey is an examination of the facts entering into the business and management of a farm. A survey is an analysis of a number of farms in a region with a view to determining the factors that make for greater success in farming. It takes into account the size of the farm, the acreage and yields of the crops raised, the kind and amount of live stock and machinery equipment kept, the kind and amount of different farm receipts and the kind and amount of different farm expenses.

A Farm Business Analysis survey was made of a number of farms in six counties of Vermont in 1914, 1915, and 1916. The same farms were not visited each year but enough were visited each year to secure representative data. In Table I is shown a summary of the business of these farms.

TABLE I. SUMMARY OF THE FARM BUSINESS ON 850 VERMONT DAIRY FARMS.

Years	1914	1915	1916
Number of farms	454	195	201
Acres per farm	170	205	218
Crop acres per farm	52	60	64
Capital per farm	\$ 8,458	\$10,566	\$ 9,316
Value Real Estate per acre	31	35	26
Receipts	\$2,075	\$2,291	\$ 2,493
Expenses of operation	1,249	1,243	1,251
Farm Income	826	1,048	1,242
Labor Income	404	519	777
Operator's Labor	\$ 446	\$ 475	\$ 464
Per cent on capital	4.5	5.4	8.4
Family labor	\$ 73	\$ 81	\$ 77
Family income	899	1,129	1,319

The capital includes the value of the real estate and the value of the live stock and machinery equipment. The

profits from the farm business are measured in three or more ways. The farm income, which is the difference between the total farm receipts and the total farm expenses, represents the combined returns on capital and the value of the farmer's own labor. The labor income represents the return for the farmer's own labor and is determined by subtracting from the farm income the prevailing rate of interest on the farm capital. The rate of interest used here (for these years) was 5 per cent. Per cent return on the capital is another way of expressing profits. This is found by subtracting from the farm income the value of the farmer's labor. This difference may be said to represent the amount of money earned on the capital invested.

The data in this table and the following tables, represent pre-war values. The capital, receipts and expenses should not be compared with present values but can be used only in comparing farms or groups of farms for those years. Unfortunately no recent figures are available in Vermont but these old data will serve to show what type of information is gathered and what purpose it is to serve.

Farm Business Analysis surveys give a fund of information for general or public use. Legislation or general movements affecting the farmers' welfare often call for information regarding the tendencies in farming. One of the purposes of surveys is to meet this demand.

Are farmers making large profits? Are many farmers making only a bare living? How much are farmers making? Table II indicates the variation in farm incomes for 850 farmers.

TABLE II. VARIATION IN FARM INCOMES OF 850 FARMERS IN NINE COUNTIES OF VERMONT.

Years	1914	1915	1916
Number of farms	454	195	201
Farm income groups:	Per cent	Per cent	Per cent
\$4001—\$5000	.7	.5	
\$3001— 4000	.4	.5	1.0
2501— 3000	1.1	1.0	3.5
2001— 2500	3.1	5.6	9.9
1501— 2000	7.0	16.4	14.4
1001— 1500	19.4	22.6	28.9
501— 1000	33.7	34.4	34.8
1— 500	31.1	16.4	7.0
0— 500	3.3	2.6	.5
501— 1000	.2		

It will be noticed that few of these men make big profits and few of them make actual losses. In 1914, one-third of the men made less than \$500. The following two years a smaller proportion of the men fell in this class and the proportion in the \$1,000 to \$1,500 class increased. It is significant that for each of these three years over two-thirds of the farmers studied are making a good living from the farming business.

In Table III the variation in labor incomes are shown.

TABLE III. VARIATION IN LABOR INCOMES OF 850 DAIRY FARMERS IN NINE COUNTIES OF VERMONT.

Years	1914	1915	1916
Number of farms	454	195	201
Labor income groups:	Per cent	Per cent	Per cent
\$4001—\$5000			
3001— 4000	.2		
2501— 3000	.7	1.0	
2001— 2500	.9		2.5
1501— 2000	2.0	3.1	7.5
1001— 1500	8.4	11.3	20.4
501— 1000	23.3	31.8	33.8
1— 500	45.4	38.5	30.8
0— 500	16.7	12.8	5.0
501— 1000	1.8	1.5	
1001— 1500	.6		

The labor incomes are lower in that 5 per cent interest on the farm capital has been deducted from the farm income. Labor income represents what the farmer received for his labor in addition to the use of his house and the use of vegetables, milk, eggs, and wood taken from the farm. If these farmers would have had to pay 5 percent interest on the farm capital in addition to the regular farm expenses about one-half of them would have left less than \$500 as (profits or) returns for their own labor. In 1916, 30 per cent of the farmers had labor incomes of over \$1,000 while in 1914 only 12 per cent were in that class. If time and space would allow the farms could be analyzed and reasons given for these variations from year to year. In what are called continued surveys, where a large number of farms are studied over a series of years much valuable information is gathered regarding the successful and the unsuccessful farmers and the reasons for their success or failure.

What does the average cow return in money? In Table IV is shown the variation in receipts per cow for the

three years. Only dairy farms are included in this table. It should be remembered too that milk was worth during these years only about one-half what it was worth in 1920.

TABLE IV. VARIATION IN RECEIPTS PER COW FOR 850 VERMONT DAIRY FARMS, 1914-1915-1916.

	Receipts per cow				
	\$40 and less	\$41 to \$60	\$61 to \$80	\$81 to \$100	Over \$100
	Per cent	Per cent	Per cent	Per cent	Per cent
1914.....	9	35	33	19	4
1915.....	7	40	32	14	7
1916.....	5	21	37	24	13

However, the Table shows what proportion of the herds were real good and what proportion very poor. The great bulk of the herds are in the middle groups.

What are some of the important factors affecting income in farming on these dairy farms? Table V indicates how labor incomes vary with the production per cow and crop yields. The farms were sorted into three groups, those with poor producing cows, those with medium producing cows, and those with good producing cows. Each of these groups were subsorted into three groups, those with poor, medium, and good crop yields. It will be noticed that the labor income increases as the quality of the cows improves and the crop yields improve.

TABLE V. PRODUCTION PER COW, CROP YIELDS, AND LABOR INCOME ON 850 VERMONT DAIRY FARMS, 1914, 1915, 1916.

Farms with:—

Poor Cows:

With low	crop yields	labor income was	.....	\$245
With medium	"	"	"	313
With high	"	"	"	526

Medium Cows:

With low	crop yields	labor income was	.....	417
With medium	"	"	"	579
With high	"	"	"	736

Good Cows:

With low	"	"	"	600
With medium	"	"	"	823
With high	"	"	"	856

The farms with poor cows and poor crop yields returned \$245 labor incomes, while those with good cows and high crop yields returned \$856 labor incomes. The farmer who has good crop yields but feeds these crops to poor cows is handicapped as is the farmer who has good cows but spends labor and money on crops which return poor yields.

Good cows are as important with small herds as with large herds as shown in Table VI. The farmer with a large herd though is doing a bigger business and he loses an opportunity to make more money if his cows are poor. It will be noticed that in the group of large herds the farmers with poor cows make labor income of only \$459 while those with good cows make \$1,177.

TABLE VI. SIZE OF HERD, PRODUCTION PER COW, AND LABOR INCOME ON 850 VERMONT DAIRY FARMS.
1914-1915-1916.

Herds of 12 cows and less:			
With poor	cows,	labor income was	\$ 271
With medium	"	"	336
With good	"	"	454
Herds of 12 to 20 cows:			
With poor	cows,	labor income was	294
With medium	"	"	579
With good	"	"	748
Herds of over 20 cows:			
With poor cows,	labor	income was	459
With medium cows,	"	"	757
With good	"	"	1,177

It may not be possible and sometimes not practicable to have a good strain of pure-bred cows but any farmer can keep a record of the production of each individual cow and thus be able to weed out the poor producers and breed only the good producers. The quality of the bull kept is very important in raising high production heifers.

Proper care of the stable manure, use of good seed and good cultivation practices are all important things to keep in mind in producing good crops.

In a more recent survey made in Hillsboro County, N. H., a study of the dairy farms brought out in a striking

manner the importance of high producing cows on dairy farms. In Table VII it will be seen that the labor income increased from \$39 to \$851 per farm as the quality of cows increased.

TABLE VII. RELATION OF PRODUCTION PER COW TO LABOR INCOME ON 77 DAIRY FARMS IN HILLSBORO CO., NEW HAMPSHIRE. 1918.

Production per cow (annual)	Less than 3600 lbs.	3600 lbs.to 5500 lbs.	Over 5500 lbs.	All farms
Number of farms.....	24	29	24	77
		Average	per farm	
Farm area.....	152	168	181	167
Man work units per man.....	230	250	235	239
Number of cows.....	10.8	10.2	10.3	10.4
Production per cow, pounds.....	2,897	4,523	6,687	4,691
Value milk sold per cow.....	\$ 104	\$ 150	\$ 219	\$ 157
Feed purchased per cow.....	43	54	75	57
Labor Income.....	\$ 39	\$ 527	\$ 851	\$ 476

The value of milk sold per cow was \$115 more per cow with best herds than with the poor herds while the difference in cost of feed purchased per cow was only \$28. The best herds were on larger farms but the size of herd and amount of work performed per man was about the same. This data emphasizes the importance of good cows on dairy farms.

Farm Business Analysis Surveys determine standards of the business of farming for the community in which it is made. It provides a measuring stick for the individual farmer to study and with which to compare his own business. To do this intelligently he must know his own feed cost him? What are his crop yields? What does his labor cost him? What prices is he receiving for the products he is selling? The farmer who can answer these and other questions relating to the details of the management of his farm can study his business intelligently and determine what part of his business in particular needs improvement.

DAIRY SANITATION.

A. A. BORLAND, PENNSYLVANIA STATE COLLEGE.

"Dairy Sanitation" sounds like a formidable subject. The dictionary, however, states that "sanitary" simply means "healthful", hence I am to speak about dairy healthfulness or in other words the practices that make for a healthful milk supply. This then is a subject in which I am sure, you are all deeply interested for no Vermonter would want to produce and market, or to consume milk that is anything else but healthful.

Good milk, as you are aware, is the most perfect single food known. Not only is it readily digestible and its food constituents well proportioned but it contains the so called "vitamines"—elements which are essential to the growth and well being of the young, and also of high value to adults.

One of these so called "vitamines" is found principally in the butterfat of milk, the yolk of eggs and the leaves of trees or in leafy vegetables. It is a growth promoting principle and also prevents an eye disease known as Xerophthalmia. Another of these protective substances is found in milk and in most common foods. It prevents Beri-beri, a disease characterized by paralysis. Another has to do with the prevention of scurvy.

Nature intended that milk should pass directly from the Mother to the offspring. We have departed a long way from Nature's original plan and now use milk two, three, or more days after being drawn, but the longer milk is held after being produced, the greater the likelihood that its food value will be lessened.

This is occasioned by the fact that milk is also an ideal food for the minute forms of life known as bacteria. Some of these are not detrimental to human welfare. Others are very much so, for instance, those that cause typhoid fever, scarlet fever and summer complaint in infants.

Large numbers of bacteria in milk are always undesirable for such a condition means one of three things,—either the milk is unclean, or it is old, or it has not been properly cooled. Large number of bacteria do not mean that disease germs are necessarily present, but the likelihood is always greater with the larger numbers of bacteria. When bacteria have once gained entrance to milk it is impossible to get

them out and under favorable conditions of temperature they multiply so rapidly that one might become a million in twenty-four hours.

The production of sanitary, healthful milk is comparatively simple and not necessarily an expensive matter. It requires first, clean healthy cows and attendants; second, small top milk pails to prevent dirt or dust from falling into the milk; third prompt and efficient cooling to prevent the multiplication of bacteria; and fourth, the sterilization of all milk utensils after use.

Pasteurization makes milk safe and is desirable where herds are not tuberculin tested and assured of being free from disease, and where the attendants also may possibly be disease carriers. Pasteurization does not lessen the food value of milk nor destroy the vitamins except in case of the one preventing scurvy. This may readily be remedied by the addition of orange juice, tomato juice, or potato water.

The cows should be clean. A few minutes' time spent each day with the curry comb and brush will prevent the accumulation of manure on the flanks and sides of the cows kept in the stables. Then if the udder and flanks are wiped with a damp cloth shortly before milking, very little dust or dirt will fall into the pail during the milking process. Experiments show that under ordinary conditions there are likely to be ten times as many bacteria in milk from cows with unwiped udders as with those whose udders and flanks had been wiped with a damp cloth before milking.

The attendant should milk with clean dry hands. If you have ever seen any one milking with moist hands you will have noticed how easily a drop of dirty milk might fall into the pail, carrying with it thousands of bacteria. The methods of the man doing the milking and taking care of the milk are always of much greater importance than the equipment. At one time the cleanest milk coming in to the city of Burlington was from an ordinary barn, but the dairyman was scrupulously clean in milking and caring for the milk; the dirtiest milk came from a costly barn but slack methods were employed. I do not mean to infer that it is easier to produce healthful milk in a dirty barn than a clean one, but that the methods are of more importance than the barn. Clean cows and clean attendants are the first essential in producing sanitary milk. No expenditure of money is involved and but comparatively little time.

A small-top pail should be used in milking. A hooded cover on the milk pail, so that a comparatively small opening is presented, will greatly lessen the amount of sediment that otherwise might fall into the pail during the milking process.

Since a dairyman must have a milk pail anyway, it is but little more expense to buy a small-top pail, than the ordinary open pail. The latter may be converted into a small top pail cheaply by getting a tinner to place a hood on it. At Illinois it was found that when cows were not well cleaned prior to milking, eighty times as much sediment was found in the milk where the open pail was used as compared with a small-top pail.

Prompt and efficient cooling of the milk is necessary to prevent the multiplication of bacteria. At a temperature of 70° F. to 90° F. bacteria multiply with great rapidity. At temperatures below 50° F. very little multiplication takes place. Therefore, milk should be cooled quickly and thoroughly. The best cooler is one in which the milk is spread over a thin sheet of cold surface, cooled and kept cold by ice water or ice cold brine. A number of such coolers are on the market at prices that put them within the reach of any farmer. The next best method is to put the milk in cans and place the cans in a tank of ice water, stirring the milk frequently until cold. If ice water is not available, the cans may be placed in running water or in a tank between the sources of the water supply and the stock watering box. The can lids should be slightly ajar until the milk has become as cold as it is possible to get it.

Sterilized utensils is the fourth and last essential in producing milk with low bacterial count. It has been found that the dairy utensils are frequently the most fruitful source of bacteria in milk. Each time after the utensils are used, they should be rinsed with cold or luke warm water, then washed with hot water, using a washing powder and a stiff brush, and finally sterilized with live steam or else immersed in water and boiled for five to ten minutes. This again is inexpensive and so simple "that a wayfaring man might not err therein."

These four simple and inexpensive precautions can be followed by any one without great effort and if largely practiced would result in real benefits to the producer, as well as to the consumer. More attention and discrimination is constantly being given by the consumer to quality in dairy products, and the producer who recognizes this fact and acts accordingly will be the gainer in the long run.

Many creameries and milk plants now grade the purchased raw material and pay according to grade. All of them ought to. Excellent butter, cheese, ice cream or market milk can never be made from low quality raw material. Butter scoring 92 points today sells on the Elgin market for 55 cents per pound while butter scoring 89 points, sells for

only 45½ cents. This little difference of three points in the score makes a difference of 9½ cents in the price. Ordinary market milk in most cities today ranges in price from 14 to 16 cents per quart but "certified" milk which is nothing more than "quality" milk sells for 25 to 32 cents per quart. Furthermore the consumer who buys dairy products of good quality wants more and the demand is thus increased. On the other hand poor quality dairy products disgust the consumers and they resort to substitutes. This injures not only the dairyman himself but all other dairymen and results in lessened demand and lower price.

Dairy Sanitation is indeed a timely and important subject. Healthful and high quality dairy products may be had, so far as the producer is concerned, by attention to four simple rules.—Clean healthy cows and attendants, the use of small-top milk pails, prompt and thorough cooling of the milk and the sterilization of milk utensils after each using.

REPORT OF COMMITTEE ON RESOLUTIONS.

Vermont alone among the States makes no appropriations to its State College of Agriculture, for instructional purposes. Its only contribution during two generations has been Morrill Hall. We believe it is high time that the State ceased being a minority of one. We call upon the present State legislature to heed the suggestion of Governor Hartness and to listen to the insistent call coming from the Vermont creameries. We urge the erection, equipment and maintenance of an adequate dairy building for the College of Agriculture; and we direct our officers to represent us before the State Legislature in behalf of this proposition.

We urge the reenactment on an annual basis of No. 106 of the Acts of 1919 in support of the several Farm Bureaus. We direct our officers to represent us before the State Legislature in behalf of this proposition.

We believe that the hands of the Commissioner of Agriculture should be upheld in the campaign which is being waged in cooperation with the Federal Department of Agriculture against bovine tuberculosis. His able presentation before us, setting forth the needs of his department in this campaign, has greatly impressed us. The delays therein due to inadequate State appropriation are exasperating and the results unfortunate. We believe that this work is in the interests of all the people, of consumers as well as producers; that it should be looked upon quite as much as a public health measure as one in the interests of agriculture. We urge the careful attention of the State Legislature to his constructive and sane program.

The members of the Dairymen's Association listened last night with much interest to Professor Lockwood's exposition of the purposes and needs of the New England Dairy and Food Council. We appreciate its potentialities and its potency as an educational and advertising agency which seeks to extend the knowledge of the food value of milk. We believe the more that milk is used the better physically, intellectually, even morally, will be those who use it. We feel certain that its increasing use by school children will lead to the upbuilding of a sturdier citizenship in the years to come. We feel, furthermore, that its larger usage means greater prosperity to the producer, since increasingly that bane of our business, the milk surplus, will

be thrust into the background. From every standpoint, we heartily commend this fine piece of work to our entire constituency.

In an Association as large as ours, made up of mature men and women, inevitably as the years flow on, our necrological record increases. Doubtless many of our members pass away, the places which have known them know them no more, and because of the looseness of the tie which binds us and our wide dispersal throughout the State, we know not when we gather annually that they have passed away. But the fitting custom which has been established of noting briefly their passing, when it comes to our attention, is worthy of continuance.

A week ago tonight, at his home in Hartland, Mr. C. C. Gates, a longtime member of this Association, formerly its Vice-President, a frequent attendant at our meetings, a good farmer, breeder of registered Jersey stock of which he was justly proud, laid him down to sleep in the full expectation of waking in the morning for the morrow's round of labor; but he did not waken from that sleep in this world. A quiet, unobtrusive gentleman, whose life and work had been an example to those about him, a sturdy, dependable, typical Vermonter, has passed on and "his works do follow him."

We of the Maple Sugarmakers' Association extend grateful recognition to our State Department of Agriculture for their cooperation with the officers of State Association in the splendid educational campaign carried out through the exhibit of maple products at the Eastern States Exposition at Springfield, the Vermont State Fair at White River, the National Grange at Boston and the Connecticut Horticultural Exhibition at Hartford, Connecticut. We wish to make special mention of the personal efforts of Mr. Amos J. Eaton of the State Department of Agriculture and Mr. C. A. Badger of the Sugarmakers' Association.

We appreciate the recognition given us by the press, who have given us freely of their space in write-ups and announcements of meetings. We extend thanks to the officials of the University for their hospitality and goodwill in turning over their commodious quarters for our use. We commend and thank the machinery and food exhibitors for their efforts in making attractive educational displays.

J. B. CANDON, Chairman.
W. H. VAUGHN,
A. D. LYNCH.

BUSINESS MEETING.

At the annual business meeting of the Association the following officers were elected:—

PRESIDENT,

S. L. Harris Proctor

FIRST VICE PRESIDENT,

E. C. Hillis East Montpelier

SECOND VICE PRESIDENT,

G. H. Terrill Morrisville

SECRETARY,

O. L. Martin Plainfield

TREASURER,

W. H. Harrington North Pomfret

AUDITOR,

F. L. Davis Hartford

F. L. Bickford of Bradford made a motion that the Association pay direct to the Women's Auxiliary one hundred dollars annually for its use in providing entertainment during the convention, rather than paying the expense incurred by it each year at its meetings. This motion was made at the request of the members of the Auxiliary, and was unanimously carried.

After continued discussion on the question of the city for holding the 1922 meeting in, it was voted to make Burlington the gathering-place.

Adjournment.

THURSDAY EVENING.**BANQUET.**

When the doors of the spacious dining room of Hotel Vermont were opened at 8 o'clock every seat was quickly taken, and more tables and chairs were moved from other rooms to accommodate the members of the two associations and their friends. The banquet was one of the most enjoyable that the associations have ever held. A spirit of jollity and good humor pervaded the hall, and if the herds of lowing kine back home could have seen some of their staid masters and mistresses laughing, talking and wearing the vari-colored head dresses of carnival time, they would never have recognized them as the people who did the chores just the day or two before.

When Congressman Frank L. Greene was introduced as the presiding officer of the banquet, by President Harris of the dairymen, he received a royal tribute in the form of a rising ovation. Mr. Greene was his usual jovial self and kept the assemblage in good humor, and also gave a few words of advice. The burden of his talk was that "nobody ever got something for nothing." In this way he warned the farmers to be especially wary of accepting some of the later-day theories for the elimination of economic and social troubles. The lesson is that we must now take our medicine for the momentary debauch that the country has been through, and the sooner we do it the sooner it will be over.

The next speaker was Governor James Hartness, who asked the cooperation of the people in his program for the help of the worker, incidentally bettering Vermont, and affording a means of keeping the Vermont youth in Vermont. He made a general plea for continuity of service of the men in the various State departments that really do the work, but said that the honor of being governor of the State is too great for one man to occupy the place for more than two years.

President Guy W. Bailey of the University of Vermont made a few general remarks on the conservative character of the Vermont people and the general safety of the home in Vermont and expressed the hope that Vermont would

cling to the sterling qualities that had brought her to her present position, and he thoroughly clinched his remarks by the use of several well chosen and splendidly recited verse.

A pleasant break came in the program at this point, when Toastmaster Greene requested E. J. Parker of Grand Isle, the only living charter member of the Vermont Dairy-men's association to stand that the guests might look upon this pioneer of good dairying in the State.

O. E. Bradfute, Vice President American Federation of Farm Bureaus of Ohio, the last speaker treated the question of marketing farm products in a general way and gave every farmer and many who are not farmers, but consumers of farm products, something to ponder on regarding this subject. He told of how the farmer had never set the price on his product, but had let the buyer set it, and then also set the price for the commodity that was purchased with the money received in the earlier transaction. He said in the past the farmer has been forced to sell at inopportune times because no machinery was available to assist him in doing otherwise, and he urged organization in the matter of selling which will bring about beneficial results to the farmer that cannot be expected when the individual farmer acts alone.

Following the addresses Bennett Springer, gave a second entertainment of the week, in magic. This was the close of what was generally conceded by all who attended to be one of the best conventions that the two State-wide organizations have ever held.

THE WOMAN'S AUXILIARY.

The Annual business meeting of the Woman's Auxiliary to the Vermont Dairymen's Association was held in the Billings Library Wednesday afternoon.

The women were welcomed by the President Mrs. H. M. Farnham.

The Secretary's report was read and adopted.

The following resolutions were presented and adopted.

It seems fitting at this time to pause a moment and pay a tribute to our departed President—Mrs. Brooks. One year ago she was here. The relentless Reaper has laid upon her his hand.

Today we present the following resolution.

WHEREAS.—Our President and our friend Mrs. Brooks has answered a higher call to come into the very presence of the Great Father of us all—her work here ended—her work there begun.

RESOLVED.—That our lives in touching her life here year by year have caught some of the cheery inspiration in hers. Her life noble in its purpose, was marked by a liberal charity.

A devoted wife—a faithful mother—a loyal friend, she gave the countersign of a character worth while.

RESOLVED.—That we believe when her feet were set in the unknown trail that leads to the shrouded mysteries of the future, she passed the boundaries without fear and without regret—content if she might know that in each heart that knew her best there was left a tender spot and an empty place—because of her going.

RESOLVED.—That to her family we extend our sympathy and say with them Good Night—with confidence that when the mystic portals shall swing open to the land of the hereafter in the glorious dawn of the day without night—we shall all meet and say Good Morning.

That this be spread upon our reports and a copy be sent the family of our departed President.

LUELLA L. BICKFORD.

The following tribute was read by Mrs. Geo. H. Dunsmore of St. Albans.

In memory of our late President Mrs. H. K. Brooks of St. Albans.

Madam President and Members of the Ladies' Auxiliary:—

For several years it has been our good fortune to meet together for mutual pleasure and education and while our circle has been an ever changing one yet as we gather to-day, we miss the kindly greeting, the pleasant smile of the one we had chosen as our leader.

It was only a few short weeks after the close of our last meeting, on Feb. 29, 1920, that Mary Reade Brooks heard the "one clear call" at the "sunset and evening star" and with a smile and a cheering wave of the hand entered into the better life.

A year has gone by since then, the sweet green days of Spring, the Summer days, the gorgeous Autumn, and again the snowy days of Winter, and ever in her home and in our hearts and in our community there has been a vacant place.

Born Jan. 25, 1877 in Bellows Falls Vt. the daughter of Lavant H. and Sarah A. Reade, she was educated in the public schools, and completing a High School course, entered Smith College, graduating in the class of 1900. Later she taught English, Chemistry and Mathematics in the High Schools of Bellows Falls and of Walpole, N. H.

She traveled quite extensively, at one time going to Illinois to a College chum's wedding returning by a different route, and also accompanied her father, Judge Reade, at that time a member of the Public Service Commission, on an all summer's trip through the United States in company with other Commissioners, this trip culminating in a convention in San Francisco. She also went abroad in 1907 with a party of College friends visiting France, England, Italy, Germany, Belgium, Switzerland and Holland.

On Jan. 15, 1908, she married Mr. H. K. Brooks and went to live on the Brooks farm in St. Albans town. The following January a daughter, Dorothy was born and later another daughter, Alice Reade.

These two little girls, her husband and aged mother survive. She was intensely patriotic and was made treasurer of the Red Cross, and her zeal and hard work put over the Fourth Liberty Loan in St. Albans town when it seemed that it must fail. At the time of her death she was Chairman of the School Board and Chairman of the "Stand-by Smith College Campaign" in Franklin County.

Perhaps these few lines portray her character better than anything else, I might say,—Just to be kind, to be tender and true,

Just to be happy the whole way through
To lighten the burden for some one each day,
For never again shall I pass this way.
Just to remember God's in his Heaven
Just to be thankful for all he has given
Just to give beauty for ashes alway
For never again shall I pass this way.
Just to love right and hate nothing but wrong.
Just to make life one grand sweet song,
To lie down in peace at the close of life's day
And to wake up to meet him who once passed this way.

The comment that many have made is "how much she will be missed". Why she was called up higher in the zenith of her life we do not know, but we shall find the light she carried falling in our path and making it clear and we shall follow knowing that she is just around the bend in the road.

There was a general discussion on increasing membership and interest in the Auxiliary.

Meeting adjourned until the following day.

Following the meeting a very pleasant reception was tendered to the Auxiliary by the Woman's department of the University of Vermont. A fine musical program was rendered, refreshments were served and an enjoyable social hour passed.

A large number of women attended the meeting of the Woman's Auxiliary on the Roof Garden of the Hotel Vermont Thursday afternoon.

After selections by the Van Ness orchestra the President, Mrs. H. M. Farnham extended greetings to all present and expressed the sadness felt by all over the death of the late President Mrs. H. K. Brooks.

Mrs. Farnham read the following poem written by a friend in Montpelier. The author's mother wrote poetry for the Dairymen's Association in 1878.

Put away the mop and dishcloth,
Lay aside those overalls,
Neighbor Jones will milk and fodder
We must answer higher calls.
Twelve long months we've labored daily
Till the last big chore is done,
Not but what if we were looking
We could find another one,
But feel that mind and body
Need a respite from dull care,
So we Dairymen and women
Sauntered forth for change of air.

Here we swap our views on farming,
 And on many another theme,
 Brush the cobwebs from our brain cells
 Grasp at every broadening gleam.
 For when Dairy folks assemble
 Common sense is apt to rule
 And we gain much information;
 Truth, it's quite a training school.
 Tho there's many think we're hayseeds
 Yet we keep an open mind,
 When it comes to up-to-dateness
 We're not lagging far behind.

Heirlooms—like the League of Nations—
 Yes, I think we'll tackle that;
 Think we'll cross the extra t's out
 Dot the I's and leave it Pat.
 Some declare we sort of meddle,
 Muddle things that do not mix,
 Can't folks learn that even hill farms
 Raise good crops of politics?
 Like as not we're sometimes backward,
 Better that than be so gay
 That we hurry Nature's time piece
 Changing God's own time of day.

'Spose we tried the eight hour system,
 Say right plumb in planting time
 Or when hay with rain is threatened;
 Why 'twould be a mortal crime.
 Still if folks can get good living
 By the Gompers easy way,
 Most of us would, very kindly,
 "Let George do it" every day.
 Yet when produce takes to soaring
 It would move a stone to tears
 Just the hear the lamentations
 'Gainst these hayseed profiteers.

Tho we work for twelve long hours
 Those who watch the stroke of four
 Seem to think that milk just bubbles
 From a crevice in the floor.
 Think that hens lay eggs gratis
 Pigs and poultry need no care,
 (Pity we can't heat our houses
 With a bit of their hot air.)
 We producers learned quite early
 How to solve this little sum;
 If we loaf and do no planting
 Generous harvests do not come.

It is true that vexing questions
 Face our government to-day,
 And we dairy men and women
 Ought to help point out the way;
 Do our part to lift the burdens,
 Meting justice out to all.

We are ready, only waiting
To be sure we hear the call.
Never have we failed or faltered,
Never have we tried to shirk
War or famine—when the cry came—
We rained sweat from honest work.

Many classes—they perspired
Moisture gathered on their brows,
But from us it dripped in rivers
While we ploughed and milked the cows.
Now if Uncle Samuel bids us
Help the world become more sane,
He'll find out we busy farmers
Never yet were asked in vain.
We won't ask for special measures
Harmful to our fellow men,
But we'd like to see this planet
Sort of rational again.

Hark! Who was it whispered "chestnuts"?
Never mind my spell is done
Now I'll let some abler speaker
Finish what I've just begun.
When I go to Dairy meeting
Tho I think myself it's queer,
I just talk and talk and then some,
Think I'll come again next year.

Written by MRS. F. A. HAYDEN,
Montpellier, Vt.

Miss Marion L. Young of Middlebury College spoke on "The Importance of Correct Posture". She said in part:—
There are two requirements of correct posture, to stand erect in such a way that the least muscular effort is required, to so stand that the vital organs are most efficient.

Children should not be told to throw back the shoulders as this causes them to bend the spinal column and thus form a hollow back.

She then demonstrated a correct posture drill.

The bending of a child over a desk at school is very harmful in as much as it causes the shoulders to fall forward causing the anterior posterior curve or what is known as round shoulders. This position is very harmful to the lungs. They should have fitted desks and seats of such a height that the knees are at right angles with the body.

Children need milk in their diet. Survey shows that those who drink milk are those who naturally assume correct posture.

A boy's suspenders or a girl's waist often force out the sides of the shoulders causing a collapsed chest. This can

be prevented by buying those manufactured to correct this fault.

To sit correctly upon a chair sit with lower part of body against the chair back then lean back placing the shoulder blades squarely against the back of the chair.

Children should be taught to sleep on both sides as continuous sleeping on one side forces the shoulder and hip out of place.

Mrs. H. T. Johnson of Montpelier sang two selections. She was dressed in old fashioned costume. These selections were much appreciated.

The last speaker of the afternoon was Cheney C. Jones, Assistant Division Manager-Red Cross Work for New England.

He said,—“Do not say, Let us forget. The war is over, but let us assume the obligations we are under to those who fought for us.”

During the war for the first time we were united in a common cause and were able to put across what we were trying to do. The Red Cross calls again for the people to unite in a common cause.

The Red Cross is fighting tuberculosis, infant mortality, and the unnecessary death of mothers at the time of confinement.

Each person can do their part in the fight. Allow plenty of fresh air in the sleeping room. Whenever possible a course in home nursing. Such courses are now given in many towns.

He especially emphasized the great good accomplished by the public nurse both in the schools and in the homes.

At the close of the program a short business session was held. Mrs. O. L. Martin of Plainfield was chosen Vice President for one year. The following committees were appointed by the President.

Committee on change of Constitution and By-laws:—Mrs. Ellsworth Sisson, Mrs. F. H. Bickford, Mrs. O. L. Martin.

LIST OF MEMBERS FOR 1921.

Mrs. Howard Merrill	North Williston
Mrs. Frank Talcott	Williston
Mrs. Lewis La Tullippi	Williston
Mrs. O. E. Reynolds	Burlington
Cecil H. Marble	95 Squantum Sq., Atlantic, Mass.
Mrs. Geo. Temple	Randolph
Mrs. H. T. Johnson	Montpelier
Mrs. W. F. Chapin	Essex Junction
Mrs. O. W. Baker	Concord
Mrs. Stewart Prindle	St. Albans
Mrs. W. C. Fuller	Richmond
Mrs. O. L. Martin	Plainfield
Mrs. A. F. Johnson	Bradford
Mrs. Elmer E. McGaffey,	
61 Dartmouth St., Winter Hill, Mass.	
Mrs. L. S. Harris	Proctor
Mrs. H. B. Ballou	Medford, Mass.
Mrs. F. W. Draper	Enosburg Falls
Mrs. Ellsworth Sisson,	
190 Albert Ave. Edgewood, Providence, R. I.	
Mrs. F. L. Bickford	Bradford
Mrs. H. M. Farnham	Montpelier
Mrs. M. F. Donahu	Essex Junction
Mrs. E. W. Parent	Sudbury
Mrs. Geo. Hazzard	Charlotte
Mrs. F. M. Warner	Vergennes
Mrs. E. A. Hillis	North Montpelier
Mrs. C. M. Story	Chelsea
Miss A. M. Harrington	West Hartford
Miss E. H. Eldred	Swanton
Mrs. G. M. Jones	Waitsfield
Mrs. Ina R. Niles	Derby
Mrs. Geo. H. Dunsmore	St. Albans
Mrs. H. J. Wright	St. Albans

ANNUAL MEMBERS VERMONT DAIRYMEN'S ASSOCIATION, 1921.

Am. Agri. Chem. Co., 92 State St.....	Boston, Mass.
Beebe, H. C.	Manchester
Barrows Stanley	Vergennes
Barney, M. E.	Randolph Ctr.
Carrigan, J. E.	Morrill Hall, Burlington
Cullen, J. W.	618 Tremont Bldg., Boston, Mass.
Clifford, A. E.	Clarksburg
Churchell, L. W.	S. Londonderry
Conant, J. F.	185½ College St., Burlington
Clewley, E. G.	135 Loomis St., Burlington
Cheney, R. E.	185 College St., Burlington
Chapin, G. W.	So. Burlington
Donahue, W. L.	Essex Junction
Eschenheimer, R.	Waterbury
Gordinier, G. A.	Troy, N. Y.
Guptil, S. W.	Waterbury
Greene, J. E.	Waterbury
Goss, C. W.	Barnet
Gould, E. C.	Marshfield
Grant, T. P.	9 Fulton Place, Boston, Mass.
Gove, C. F.	21 Loomis St., Burlington
Gray, H. E.	Newport
Fogg, Vern A.	White River Junction
Fay, H. M.	No. Williston
Frier, Harold	Vergennes
Fairbanks, C. J. (J. B. Ford Co.)	101 Tremont St., Boston
Howe, F. B.	Burlington
Hodgkins, P. J.	Johnson
Hoag, E. M.	Burlington
Hoskinson, H. M.	Cuttingsville
Harris, Homer	Middlebury
Johnson, A. F.	Bradford
Judd, W. S.	Enosburg Falls
Jackman, W. H.	Vergennes
Jones, V. R.	Montpelier
Jones, W. G.	Randolph
Dr. J. M. Jenne.	272 Main St., Burlington
Kibby, E. F.	Randolph Ctr.
Knapp, G. A.	St. Johnsbury
Kendrick, A. E.	Winooski

Kendall, S. R.	Brandon
Lee, H. M.	Windsor
Lucia, J. B. Jr.	Middlebury
Lamson, Roy	7 Fletcher Place, Burlington
Lowitz, C. C.	101 Tremont St., Boston
Lupine, L. A.	Woodsville, N. H.
Ladd, N. P.	Richford
Lewis, J. A.	Charlotte
Miller, F. J.	St. Johnsbury
Mudgett, R. C.	Essex Junction
McGinnis, C. P.	5 Russell St., Charleston, Mass.
Manning, E. V.	Rutland
Marble C. H.	33 S. Market St., Boston, Mass.
New Way Milker Co.	Syracuse, N. Y.
Nye, H. H.	E. Georgia
Orvis, G. W.	Essex Junction
Payne, A. J.	157 S. Union St., Burlington
Putnam, C. L.	Bethel
Porter, H. E.	Montpelier
Prindle, Stewart	St. Albans
Ross, H. F.	518 S. Union St., Burlington
Rich, Davis,	
50 Congress St., (Quaker Oats,) Boston, Mass.	
Rice, F. A.	95 Adams St., Boston, Mass.
Reed, C. L.	Vergennes
Richards, C. V.	Box 1123, Hartford, Conn.
Rumney, Geo. H.	R. F. D. 2, Montpelier
Shepard, W. F.	Barre
Smith, W. E.	44 Newcastle Rd., Brighton, Mass.
Shedd, M. E.	Fairfax
Story, L. L.	E. Fairfield
Smith, H. J.	Cuttingsville
Sisson, Ellsworth	Providence, R. I.
Stockwell, Geo. W.	Wollaston, Mass.
Shepardson, E. E.	50 Lowell St., Somerville, Mass.
Tietz, Wm.	Richmond
Williams, Ray L.	Quechee
Wheeler, H. H.	S. Burlington
Whitcomb, E. M.	Essex Junction
Wilcox, R. C.	Randolph Ctr.
Wheatley, W. H.	Randolph Ctr.
Wright, H. J.	St. Albans
Wright, S. C.	28 Constable St., Malone, N. Y.
Walker, J. W.	334 Germania Ave., Schenectady, N. Y.

LIFE MEMBERS OF THE VERMONT DAIRYMEN'S ASSOCIATION, 1921.

A

Arms, R. A. Williston
Alden, B. H. Orleans
Adams, G. H. South Barre
Allen, Charles. East Berkshire
Allen, H. A. West Milton
Allen, Henry Pawlet
Adams, William H.,
369 Marlboro St., Keene, N. H.
Aseltine, M. L. Springfield, Mass.
Aldrich, E. O.,
R. F. D. No. 2, Clarendon
Allen, G. A.,
R. F. D. No. 2, West Brattleboro
Allen, F. E.,
R. F. D., South Royalton
Ansboro, J. E. Derby
Adams, C. A. Derby

B

Baker, O. W. Concord
Bruce, M. K. Passumpsic
Badger, C. A. E. Montpelier
Burnett, R. E. North Pomfret
Burbank, J. A. North Pomfret
Burr, L. R. North Clarendon
Brownell, C. W. Burlington
Brigham, William O. Bakersfield
Burt, William Essex
Blair, N. B. Morrisville
Bliss, Abner Georgia
Bates, A. E. Huntington
Brown, J. S. Plymouth
Bishop, D. B. North Williston
Byington, C. M. Charlotte
Bigelow, A. P. Middlesex
Burke, J. E. Burlington
Burnham, W. F. So. Royalton
Barry, R. A.,
173 Chambers St., New York City
Bliss, D. S. Middlebury
Beach, H. F. R. F. D., Vergennes
Brooks, H. K. St. Albans
Brigham, E. S. St. Albans
Briggs, E. L. North Pomfret
Burnett, E. A.,
University, Lincoln, Neb.

Bond, John. East Montpelier
Blood, W. O. Norwood, N. Y.
Bass, E. L. Randolph
Bruce, H. C. Milford, N. H.
Barry, Leonidas. Springfield
Brackett, W. R.,
9 Chatham St., Boston, Mass.
Bean, G. C. Coventry
Belden, H. W. Waitsfield
Bickford, F. H. Bradford
Buxton, J. E. Middletown Springs
Brock, L. F. Barnet
Barber, E. L. North Williston
Bushnell, H. N. Waitsfield
Burrell, D. H. Little Falls, N. Y.
Brewer, J. R. Hingham, Mass.
Burgham, W. H. Montpelier
Bent, Orrin,
33 S. Market St., Boston, Mass.
Boutwell, W. C. Princeton, Me.
Bristol, E. S. Vergennes
Bellows, F. A. No. Ferrisburg
Boyden, C. F. Randolph Center

C

Curtis, H. B. St. Albans
Conn. Agricultural College,
Storrs, Conn.
Clifford, A. P. North Pomfret
Cushman, G. L.,
75 S. Market St., Boston, Mass.
Carpenter, E. P. West Waterford
Chaffee, J. H. West Enosburg
Congdon, Edwin Clarendon
Cahee, L. J. Brandon
Cook, Nelson P. Mt. Holly
Currier, P. W. Montpelier
Clarke, M. S. Clarendon
Clarke, F. H. Williston
Corliss, N. L. Swanton
Carter, W. E. Pittsford
Carrigan, J. D. Pittsford
Cady, W. N. Middlebury
Creed, C. A. Pittsford
Campbell, H. W. Bethany, Neb.
Chapman, J. H. West Rutland
Chaffee, Geo. H. Rutland
Cooke, Geo. S. E. Hardwick

Crampton, M. S. Rutland
 Cowdon, H. St. Johnsbury
 Colvin, J. C. West Rutland
 Cunningham, W. F. St. Albans
 Colburn, R. M. Springfield
 Crampton, Charles A. St. Albans
 Cobb, C. H.,

R. F. D., No. 2, Fairfax
 Crane, George Brookfield
 Chase, C. P. Proctorsville
 Chandler, G. C. Montpelier
 Chase, Perry East Fairfield
 Carpenter, O. G. Cambridge
 Candon, J. B. Pittsford
 Cloverdale Creamery,

North Underhill
 Chamberlin, H. D.,

McIndoes Falls
 Campbell, Archie,

R. F. D., South Ryegate
 Curtis, A. C. St. Albans
 Carter, A. C. Rutland
 Clark, Homer F. Charlotte

D

Daley, O. W. White River Jct.
 Donahue, W. C. Monkton
 Draper, F. W. Enosburg Falls
 Dana, E. J. North Pomfret
 Donahue, J. F. Vergennes
 Doe, G. A. Newbury
 Dutton, F. B. Woodstock
 Davis, G. A. Rutland
 Donahue, W. F. Ferrisburg
 Dodge, Harrison Morrisville
 Donahue, D. G. East Charlotte
 Davis, George F. Cavendish
 Darling, E. L. East Burke
 Davis, G. N. Castleton
 Downer, Charles Sharon
 Davis, C. H. E. Healdville
 Davis, F. L. Hartford
 Dagon, M. R. Madison, Wis.
 Dreman, R. E.,

State College, Ames, Iowa
 Dodge, L. B.,

300 No. Main St., Barre
 Davis, Geo. H. Hubbardton
 Dunsmore, Geo. H.,

R. F. D., St. Albans
 Dunklee, A. A. So. Vernon
 Darling, W. W. Boston, Mass.
 Dewey, James F. Quechee

E

Eldred, H. S. Sheldon
 Ellis, I. L. Middlebury

Edson, E.A. Burlington, R. F. D.
 Eddy, C. F. Stowe
 Ellis, Edward A. Castleton
 Estee, James B. Montpelier

F

Federal Trade Commission,
 Washington, D. C.
 Farm Stock Success,

Chenango, N. Y.
 Foster, F. O. Lansing, Mich.
 Flint, J. P. Montpelier
 Fisher, L. C. Cabot
 Farrington, C. W. West Danville
 Fletcher, William Essex Junction
 Fisher, D. W.,

Marbridge Bldg., New York, N. Y.
 Ferson, B. W. Goshen, N. Y.
 Fassett, B. F. Enosburg Falls
 Fassett, W. G. Enosburg
 Fuller, C. C. Jonesville
 Fowler, F. E. South Royalton
 Fletcher, Ex-Gov. A. M.,

Proctorsville
 Fraser, W. J. Urbana, Ill.
 Fillmore Farms Bennington
 Fuller, B. J. Williston
 The Free Library,
 17th and Spring Garden St.,

Philadelphia
 Farnham, H. M. Montpelier
 Fuller, W. C. Richmond

G

Gates, Ex. Gov. C. W. Franklin
 Gale, P. R. Stowe
 Gibbie, Geo. Groton
 Grout, L. D. Morrisville
 Grout, J. Ex-Gov. Derby
 Gloyd, Jesse Richmond
 Gilman, A. A. Randolph Center
 Gallup, J. A. West Woodstock
 Giddings, F. L. Orwell
 Greene, G. F. So. Pomfret
 Gates & Son, Charles

North Hartland
 Gale, J. E. Guilford
 Goss, W. G.,
 R. F. D., No. 4, St. Johnsbury

H

Howie, A. F. Mrs.,
 Elm Grove, Wis.
 Hewitt, J. D. North Pomfret
 Hill, W. N. Starksboro

Hathaway, F. M....St. Albans Bay
Hooper, V. A.....Blockton, Ark.
Hastings, S. J.....Passumpsic
Harvey, CloudBarnet
Hills, J. L. Prof.....Burlington
Hayward, G. M.....Middlebury
Heller & Merz Co.,

505 Hudson St., New York City
Hotchkiss, C. A.....Georgia
Hefflon, Franklin..Highgate Center
Hutchinson, William.....Norwich
Hill, H. C.....Isle La Motte
Hillis, E. C.....North Montpelier
Howard, Ernest S...West Hartford
Hall, L. C.....Westford
Herrick, A. A.,

R. F. 2, Milton

Hall, CharlesMontpelier
Head, George G.....Montgomery
Harwood, J. W.....Orwell
Hewitt, Stephen....North Pomfret
Hoadley, A. E....South Woodstock
Howe, W. H.,

R. F. D., South Royalton

Hayes, J. R.....Stafford
Hitchcock, ErnestPittsford
Higley, NathanRichmond
Hodges, R. W....Springfield, Mass.
Harwood, Burr,

R. F. D. 1, Salem, N. Y.

Harris, S. L.....Proctor
Huntley, George M.,

R. F. D., Fairfax

Hopkins, Hermann, Jr.,
Sheldon Jct.

Harrington, W. H..North Pomfret
Hyde, Wheeler & Co.,

41 N. Market St., Boston

Hastings, C. A.,
17 Union St., Springfield

Hayward, F. R.....West Fairlee

Heath, W. E.....Sharon

Hood, H. P. & Sons....Woodstock

Hood, C. H.,

494 Rutherford Ave.,

Boston, Mass.

Howe, E. L., R. F. D....So. Ryegate

Hazard, G. M.....Charlotte

Hewitt, MaryNo. Pomfret

Howard, E. S.....W. Hartford

I

Iowa State Library,

Des Moines, Iowa

Isham, Ed.St. George

Irish, V. H.....Enosburg Falls

J

Jones, E. H.Waitsfield

Jackson, L. A.Hartford

Jackson, J. J.....Fair Haven

Judd, MortonWindsor

Jaynes, R. F.,

65 Central Ave., Lynn, Mass.

Jewett, A. & Son.....Middlebury

Jones, G. M.Waitsfield

Jenne, A. M.....R. F. D., Richford

Johnson, C. C.Pomfret

Jennings, B. C.E. Hardwick

Jewett, Alden H....Williamstown

K

Kelley, G. A.....Underhill

Kingsley, C. J.....West Salisbury

Kingsley, H. E.....Montgomery

Kinnerson, J. R.....Peacham

Kidder, N. D.....Hastings, Neb.

King, M. D.....Woodstock

Kneeland, D. A.....Waitsfield

L

Leonard, Geo.Brandon

Lilly, J. O.Plainfield

Lyster, T. H.St. Johnsbury

Lawrence, HenrySt. George

Lawless, C. G.,

North Haverhill, N. H.

LePage, CharlesBarre

Loveland, J. H.....Norwich

Leary, J. A.Jericho

Leonard, W. B.Orleans

Lewis, M. J.Woodstock

Lewis, A. L.....Rochester

Lilly, C. M.....Marshfield

Leonard, C. H.....No. Pomfret

M

McCuen, R. W.....Vergennes

Maynard, A. S.Bakersfield

Marvin, ThomasMontpelier

Mosely, F. W.....Clinton, Iowa

Messer, F. A.....Greensboro

Moore, A. A.....Richford

Maxham, G. R.Woodstock

Merrill, H. J.,

R. F. D., No. 2, Burlington

Milligan, F. B.....Walden

McMahon, C. L.....Stowe

McLam, J. F.So. Ryegate

Macomber, F. H.Shelburne

McNall, J. M.....Milton

McGaffey, E. E.,
Board of Trade Bldg.,
Boston, Mass.
Martin, C. D. East Corinth
Mass. Agricultural College,
Amherst, Mass.
McDonough, P. M. Hinesburg
Martin, O. L. Plainfield
McLam, G. E. Topsham
Moody, Mark L. Waterbury
Metcalf, R. H. Stowe

N

Nelson, David,
34 Allen Ave., Springfield, Mass.
Newton, C. H. Fargo, North Da.
Nay, Y. G. Jericho
Northrup, P. B. B. Sheldon
Newell, Bigelow Stowe
Nute, Byron,
Marion, Mass., R. F. D. 1
Newton, W. D.,
R. F. D., St. Albans
N. H. Agricultural College,
Durham, N. H.
N. Y. State Library... Albany, N. Y.
Noyes, E. H. Sharon
Noyes, M. C. Sharon
Niles, J. Fletcher. Derby

P

Plummer, E. G. Groton
Public Library St. Louis, Mo.
Porter, W. C. Sharon
Page, L. B. Randolph Center
Parker, E. J. Grand Isle
Parker, J. B. Whiting
Paine, C. S. Bethel
Piper, Arthur Vergennes
Perry, E. B. & Son. Ira
Page, C. S., Ex-Gov. Hyde Park
Powers, William Brandon
Perry, S. E. South Pomfret
Pierce, J. H. Franklin
Phillips & Son. E. Candia, N. H.
Pierce, C. C. East Clarendon
Place, R. H. Essex Junction
Palmer, George New Haven
Palmer, C. E. New Haven

R

Rie, Eli West Charleston
Russell, F. L. Shrewsbury
Richmond, H. J. Deerfield, Mass.
Roberts, D. W. West Hartford

Reynolds, M. W. Middlesex
Robbins, Henry Middlebury
Roberts, L. J. Waterbury
Ruggles, E. H. Westford
Rutherford, W. L.,
Waddington, N. Y.
Ricker, N. H. Ryegate
Ridlon, M. R.,
R. F. D., Cuttingsville
Robbins, H. E. Derby
Ryan, D. E. Orwell
Roberts, G. V. Milton
Roundy, Charles C.,
136 Paine St., Worcester, Mass.

S

Smith, W. E. Brighton, Mass.
State Dairy Bureau,
State House, Boston.
Stone, W. P. Strafford
Sawyer, A. G. Groton
Spear, V. I. Randolph
Strong, P. W. North Pomfret
Slocum, A. R. South Burlington
Stanhope, Spencer,
Berkshire Center
Stiles, G. M. Morrisville
Standard Package Co.,
Board Trade Building,
Boston, Mass.
Small, Fred M. Morrisville
Stevens, N. C. West Glover
Sanderson, W. L. Milton
Sowles, A. P. St. Albans
Smead, C. D. West Brookfield
Smith, E. L.,
Mirades District,
Lindsey, Tulare Co., Cal.
Spaulding, L. C. Poultney
State Library Concord, N. H.
Sherburne, A. E. North Pomfret
Smith, N. E. Richford
Staples, Rev. C. J.,
Honorary Member,
Burlington
Saunders, M. C., 61 Chatham St.,
Boston, Mass.
Smith, F. V. Stowe
Smith, George G. St. Albans
Simpson, W. G. So. Ryegate
Smith, F. L. Fletcher
Smith, E. C., Ex-Gov. St. Albans
Sprague, N. T. Jr.,
Brooklyn, N. Y.
Strihues, J. J. Randolph
Snow, Mrs. Edward,
Swanzy, N. H.

Sprague, George K.,
East Brookfield
Swan, P. B. Montgomery
Scarff, C. W., Col. Seattle, Wash.
Sudendorf, E.,
412 E. Monroe St.,
Springfield, Ill.
Stone, M. S. Montpelier
Stone, E. A. Williamstown
Seaver, W. H. Taftsville
Somers, C. L. South Peacham
Smith, E. E. West Rutland
Sisson, Ellsworth,
P. O. Box 1176,
Providence, R. I.
Smith, Horner L. E. Berkshire

T

The Jewish Farmer,
17 Second Ave.,
New York, N. Y.
Towne, E. B. Milton
Turnbull, J. G. Orleans
Tarbox, C. Jericho
Towle, E. R. Enosburg Falls
Teachout, S. D. Essex Junction
Tarbell, E. S. Montgomery
Terrill, G. H. Morrisville
Tottingham, L. H. Shoreham
Talcott, D. L. Williston
Talcott, L. F. Williston
Talcott, J. R.,
1760 High St., Oakland, Cal.
Talbot, Frank Williston
Tarwell, F. Hampton, N. Y.
Terrill, A. N. Morrisville
Temple, G. H. Randolph Center
Towle, W. W. Enosburg Falls
Trescott, A. J. West Rutland
Tracey, J. E. Burlington
Tear, Frank... R. F. D., W. Rutland

U

Union Association Press,
47 Ann St., New York

V

Vail, H. W. Randolph
Varney, W. M. Vergennes

W

Washburn, R. M.,
University Farm,
St. Paul, Minn.
Willard, E. G. No. Hartland
Warren, L. H. North Pomfret
Willey Bros. Cambridge
Whitcher, J. R.,
R. F. D. No. 3, Groton
Williams, W. H. Rutland
Wright, Will W. Brandon
Wheeler, N. B.,
Bakers Mills, N. Y.
Wry, I. A. St. Albans
Williams, N. G. Bellows Falls
Walker, N. S. Clarendon Springs
Woodward, J. S. Enosburg
Winslow, H. L. North Clarendon
Weed, E. D. Hinesburg
Warren, Rufus Montpelier
Wheelock, H. R. Montpelier
Wright, J. J. So. Hero
Whipple, Obed Jr. North Pomfret
Wheeler, F. H. Proctorsville
Whitney, Ed. Minneapolis, Minn.
Wright, H. S. North Williston
Willard, D. S. North Hartland
Whitney, H. O. Essex Junction
Whitelaw, F. R. Randolph
Wheeler, W. H. South Pomfret
White, A. R. Burlington
Wallace, Sidney Waterbury
Walker, H. W. South Woodstock
Williams, J. B.,
Glastonbury, Conn.
Webb, J. T. New Braintree, Mass.
Weed, B. W. St. Albans
Whitman, C. D., Fishers Island,
New London, Conn.
Warner, B. F. East Burke
Winslow, Chas L. Mt. Holly
Wright, Seaver D. White River Jct.

Note—Your Secretary would consider it a favor if the members would notify him of any changes or corrections in the above list.

LIST OF CREAMERIES, SHIPPING STATIONS, CHEESE FACTORIES AND CONDENSARIES OPERATING

IN VERMONT—1921.

Prepared by the State Department of Agriculture

ADDISON COUNTY.

Creameries.

Name of Plant.	Name of Operator.	Post Office Address	Name of Maker or Manager.	Post Office Address.
Elgin Springs Cry.	Elgin Springs Cry. Co.	Addison	J. C. Thomas	Vergennes
Donahue's Cry.	W. C. Donahue	Monkton	W. C. Donahue	Monkton.
Starksboro Coop. Cry.	Starksboro Coop. Cry. Co.	Starksboro	A. E. Clifford	Starksboro
Lake Dunmore Cry.	Lake Dunmore Cry. Co.	Salisbury	Martin L. Lashua	Salisbury
Lincoln Cry.	Lincoln Coop. Cry. Co.	Lincoln	W. E. York	Lincoln
Orwell Cry.	Tait Brothers	Springfield, Mass.	C. L. Munger	Orwell
Vergennes Cry.	J. F. Donahue	Vergennes	J. F. Donahue	Vergennes
Middlebury Cry.	Coon's Ice Cream Co.	Burlington	J. B. Lucia	Middlebury
Noyes' Cry.	K. E. Noyes	Salisbury	K. E. Noyes	Salisbury
Addison Co. Coop. Dairy Co.	Addison Co. Coop. Dairy Co.	Middlebury	I. N. Bartlett	Middlebury

Shipping Stations.

Sheffield Farms Station	Sheffield Farms Co., Inc.	New York City	H. C. Dubuke	Ferrisburg
C. Brigham Station	C. Brigham Co.	Cambridge, Mass.	H. H. Ayres	No. Ferrisburg
Maine Creamery Station	Maine Creamery Co.	Providence, R. I.	Roy Kingman	Ferrisburg
Sheffield Farms Station	Sheffield Farms Co., Inc.	New York City	Chester Van Keuren	Vergennes
Sheffield Farms Station	Sheffield Farms Co., Inc.	New York City	C. A. Briggs	New Haven Jct.
Bronx Farms Station	Bronx Farms Co., Inc.	New York City	P. R. Auchman	Salisbury
C. Brigham Station	C. Brigham Co.	Cambridge, Mass.	J. M. Foley	Leicester Jct.
C. Brigham Station	C. Brigham Co.	Cambridge, Mass.	O. A. Wheelock	Bristol

Cheese Factories.

Nichols Cheese Factory	West Bridport Cheese Ass'n.	Bridport	E. J. Woodbury	Bridport
West Bridport Cheese Factory	Dickinson & Brown	Bridport	C. E. Dickinson	Shoreham
Shoreham Cheese Factory	Red Clover Cheese Ass'n.	Shoreham	E. G. Farnham.	Middlebury, R. D.
Red Clover Cheese Factory	Bridport Coop. Dairy Co.	East Shoreham	M. T. Wolcott	Bridport
Bridport Cheese Factory	Dickinson & Brown	Bridport	C. E. Dickinson	Shoreham
Hough Crossing Cheese Factory		Shoreham		

BENNINGTON COUNTY

Shipping Stations.

Schade's Milk Station
H. P. Hood & Sons Station
H. P. Hood & Sons Station
Manchester Creamery

William Schade
H. P. Hood & Sons
H. P. Hood & Sons
Manchester Dairy Co.

Yonkers, N. Y.
Charlestown, Mass.
Charlestown, Mass.
Manchester

Jay J. Woodbury
J. Shaw
F. D. McGuire
Rupert
West Rupert
North Rupert
Manchester

No. Rupert Cheese Factory

No. Rupert Cheese Co.

No. Rupert

Frank Root, Secretary
Pawlet

Cheese Factories.

CALEDONIA COUNTY

Creameries.

Barnet Coop. Cry.
Mountain View Cry.
East Barnet Cry.
Lamoille Valley Cry.
Lyndonville Cry.
Danville Cry.
South Walden Cry.
North Danville Cry.
South Peacham Cry.
Pine Hill Cry.
Noyesville Cry.
Moose River Coop. Cry.
McIndoes Cry.
H. P. Hood & Sons

Barnet Coop. Cry. Ass'n.
Mountain View Coop. Cry. Co.
East Barnet Creamery Co.
Lamoille Valley Cry. Ass'n.
Lyndonville Cry. Ass'n.
Danville Coop. Cry. Ass'n.
Holland Cry. Co.
No. Danville Coop. Cry. Ass'n.
So. Peacham Coop. Cry. Ass'n.
Plymouth Creamery Co.
F. A. Messer
Moose River Coop. Cry. Ass'n.
McIndoes Coop. Cry. Ass'n.
H. P. Hood & Sons

Barnet
West Barnet
East Barnet
East Hardwick
Lyndonville
Danville
Springfield, Mass.
St. Johnsbury R. D.
South Peacham
Boston, Mass.
Montpelier
East St. Johnsbury
McIndoes Falls
Charlestown, Mass.

J. A. Buffum
A. W. Hastre
J. R. Moore
B. C. Jennings
W. C. Conner
Nelson A. Dole
F. Miner
Fred Gadapee
F. G. Shaw
Mrs. Jenny Buck
Will Thompson
A. B. Judd
D. M. Crane
McIndoes Falls
West Barnet
East Barnet
East Hardwick
Lyndonville
Danville
South Walden
St. Johnsbury R. D.
South Peacham
Wheelock
Walden
East St. Johnsbury
McIndoes Falls
Groton

Shipping Stations.

Passumpsic Station
Alden Brothers
H. P. Hood & Sons
H. P. Hood & Sons

Plymouth Cry. Co.
Alden Brothers
H. P. Hood & Sons
H. P. Hood & Sons

Boston, Mass.
Boston, Mass.
Charlestown, Mass.
Charlestown, Mass.

A. C. Granger
A. E. Kibbee
H. L. Kay
Passumpsic
Hardwick
Walden Heights
South Ryegate

Condensaries

Name of Plant.	Name of Operator.	Post Office Address	Name of Maker or Manager.	Post Office Address.
Plymouth Condensary	Plymouth Creamery Co.	Boston, Mass.	H. M. Goodwin	St. Johnsbury

CHITTENDEN COUNTY.

Creameries.

Milton Coop. Dairy Co., Inc.	Milton	George Roberts	Milton
Jonesville Cry.	Borden's Condensed Milk Co.	C. C. Fuller	Jonesville
Lake Champlain Cry.	W. B. Johnson	A. D. Lavine	Essex Junction
Riverside Cry.	Chauncey Hayden	Chauncey Hayden	Riverside
Johnson Cry.	T. W. Johnson	T. W. Johnson	Huntington
Donahue's Cry.	M. F. Donahue	M. F. Donahue	Essex Junction
Burlington Coop. Milk Prod. Co.	Burlington Coop. Milk Prod. Co.	B. I. Newton	Burlington
Pure Milk Products Co.	Pure Milk Products Co.	A. R. White	Burlington
Shelburne Coop. Cry. Co.	Shelburne Coop. Cry. Co., Inc.	C. C. Fletcher	Shelburne
Richmond Farmers' Coop. Cry	Richmond Farmers' Coop. Cry.	Roy Ware	Richmond

Shipping Stations.

Colchester Cry.	Borden's Condensed Milk Co.	E. W. Richards	Colchester
Brown's River Cry.	Borden's Condensed Milk Co.	J. A. Hanley	Essex
Borden's Condensed Milk Co.	Borden's Condensed Milk Co.	J. W. Berry	Jericho
Cloverdale Cry.	Bryant & Chapman Co.	W. H. Gomo	Cambridge
Whiting Station	D. Whiting & Son	F. B. Allen	Milton
Borden's Station	Borden's Condensed Milk Co.	W. D. Agen	Underhill
Sheffield Farms Station	Sheffield Farms Co., Inc.	I. Booska	Charlotte
H. P. Hood & Sons	H. P. Hood & Sons	Ed. Shores	Milton
Oak Hill Station	Borden's Condensed Milk Co.	C. G. Austin	Williston
H. P. Hood & Sons	H. P. Hood & Sons	Fred James	No. Williston

Condensaries.

Borden's Condensary	Borden's Condensed Milk Co.	J. W. Berry	Richmond
Borden's Condensary	Borden's Condensed Milk Co.	P. E. Demick	Hinesburg

ESSEX COUNTY.

Creameries.

Trout Brook Cry.
Norton Mills Cream ry

|O. W. Baker
|Joseph Kehoe
|Concord
|Norton Mills

Shipping Stations.

H. P. Hood & Sons
Lunenburg Station

|East Concord
|Lunenburg

FRANKLIN COUNTY

Creameries.

Swanton Coop. Dairy Co.
Franklin County Coop. Cry.
Maple Hill Cry.
Wachusett Cry.
St. Albans Coop. Cry.

|George H. Hersey
|M. J. Quinn
|G. F. Marcy
|E. E. Derby
|H. E. Mooney

|Swanton
|East Berkshire
|East Berkshire
|Enosburg Falls
|St. Albans

Shipping Stations.

Sheldon Cry.
Alden Brothers Station
H. P. Hood & Sons
Milton Coop. Dairy Corp.
Milton Coop. Dairy Corp.
H. P. Hood & Sons
H. P. Hood & Sons
H. P. Hood & Sons

|Boston, Mass.
|Boston, Mass.
|Charlestown, Mass.
|Milton
|Milton
|Charlestown, Mass.
|Charlestown, Mass.
|Charlestown, Mass.

|Sheldon
|East Fairfield
|Sheldon Junction
|Fairfax
|Georgia
|East Fairfield
|Fairfield
|Highgate Center

Condensaries.

Federal Packing Co.
H. P. Hood & Sons

|New York City
|Charlestown, Mass.

|Enosburg Falls
|St. Albans

Cheese Factories.

Name of Plant.	Name of Operator.	Post Office Address	Name of Maker or Manager.	Post Office Address.
Richford Cry.	National Milk Products Co.	Richford	L. Chiarappa	Richford

GRAND ISLE COUNTY

Creameries.

South Hero Coop. Cry. Ass'n.	South Hero Coop. Cry. Ass'n., Inc.	South Hero	E. A. Dodge	South Hero
Grand Isle County Coop. Cry. Ass'n., Inc.	Grand Isle County Coop. Cry. Ass'n., Inc.	Grand Isle	J. B. Hoag	Grand Isle

Shipping Stations.

Boston Jersey Creamery	H. P. Hood & Sons	Charlestown, Mass.	Albert Andre	Alburg
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LAMOILLE COUNTY.

Creameries.

Mt. Mansfield Coop. Cry. & Grain Ass'n., Inc.	Mt. Mansfield Coop. Cry. & Grain Ass'n. Inc.	Stowe	F. B. Stow	Stowe
Wolcott Coop. Cry. Co., Inc.	Wolcott Coop. Cry. Co., Inc.	Wolcott	Chester Robbins	Wolcott
Gold Brook Coop. Cry. Ass'n., Inc.	Gold Brook Coop. Cry. Ass'n., Inc.	Stowe, R. D.	J. D. Santamore	Stowe, R. D.
United Farmers' Coop. Cry. Ass'n. Inc.	United Farmers' Coop. Cry. Ass'n., Inc.	Morrisville	W. D. Hamilton	Morrisville

Shipping Stations.

C. Brigham Co.	C. Brigham Co.	Cambridge, Mass.	Arthur W. Isham	Morrisville
C. Brigham Co.	C. Brigham Co.	Cambridge, Mass.	W. W. Towle	Cambridge Jct.

ORANGE COUNTY.

Creameries.

Green Mountain Cry. Corinth Cry.	Green Mountain Cry. Co. Lyndonville Cry. Ass'n.	Waits River Corinth	Waits River Corinth
Topsham Coop. Cry. Co.	Topsham Coop. Cry. Ass'n.	Topsham	Topsham
Randolph Coop. Cry. Co.	Randolph Coop. Cry. Co.	Randolph	Randolph
Washington Coop. Cry. Ass'n.	Washington Coop. Cry. Ass'n.	Washington	Washington
Williamstown Cry.	Williamstown Cry. Ass'n.	Williamstown	Williamstown
Gulf Road Coop. Cry. Ass'n., Inc.	Gulf Road Coop. Cry. Ass'n., Inc.		
So. Strafford Coop. Cry. Co.	So. Strafford Coop. Cry. Co.	No. Randolph	No. Randolph
Wells River Coop. Cry. Ass'n.	Wells River Coop. Cry. Ass'n.	So. Strafford	So. Strafford
Orange County Cry. Co.	Orange County Coop. Cry. Co.	Wells River	Wells River
Tunbridge Cry.	Tunbridge Coop. Cry. Ass'n.	Chelsea	Chelsea
Farmer's Coop. Cry. Co.	Farmers Coop. Cry. Co.	Tunbridge	Tunbridge
Neapolitan Ice Cream Co.	Neapolitan Ice Cream Co.	E. Corinth	E. Corinth
Vershire Coop. Cry. Ass'n.	Vershire Coop. Cry. Ass'n.	L. A. King	L. A. King
Neapolitan Ice Cream Co.	Neapolitan Ice Cream Co.	F. R. Haywood	F. R. Haywood
		L. S. Flint	L. S. Flint
		Wm. J. Phillips	Wm. J. Phillips
		Fairlee	Fairlee

Shipping Stations.

C. Brigham Station	C. Brigham Co.	J. J. Stimets	Randolph
Boston Jersey Cry.	H. P. Hood & Sons	J. A. Ames	No. Thetford
H. P. Hood & Sons	H. P. Hood & Sons	E. F. Corliss	Boltonville
Highland Cry.	Plymouth Cry. Co.	J. W. Layten	W. Newbury
H. P. Hood & Sons	H. P. Hood & Sons		Piermont

Cheese Factories.

Bradford Cry. Newbury Cry.	Lyndonville Cry. Ass'n. Lyndonville Cry. Ass'n.	F. H. Bickford G. A. Doe	Bradford Newbury
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Condensaries.

H. P. Hood & Sons	H. P. Hood & Sons	O. W. Terry	Randolph
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ORLEANS COUNTY.

Name of Plant.	Name of Operator.	Post Office Address	Name of Maker or Manager.	Post Office Address.
W. Charleston Cry.	J. G. Turnbull Co.	Orleans	J. G. Eley	W. Charleston
Lowell Cry.	J. G. Turnbull Co.	Orleans	D. E. Lamberton	Lowell
Black River Cry.	U. S. Bean	Lowell, Mass.	R. H. Bishop	Craftsbury
Orleans Cry.	J. G. Turnbull Co.	Orleans	Ralph Braham	Orleans
Green Mt. Cry.	Williams & Root	No. Craftsbury	Fred Estell	No. Craftsbury
Holland Cry.	Holland Cry. Co.	Springfield, Mass.	Charles Counter	Derby Line
Caspian Lake Cry.	F. A. Messer	Montpelier	Will Thompson	Greensboro
Jersey Star Cry.	Jersey Cry. Ass'n.	Irasburg	C. H. Wilder	Irasburg
Albany Cry.	J. G. Turnbull Co.	Orleans	N. C. Stevens	Albany
Meadow Brook Cry.	Meadow Brook Cry.	W. Glover	C. I. Hartwell	W. Glover
Missisquoi Valley Coop. Cry.	Missisquoi Valley Coop. Cry. Ass'n.	So. Troy	George Fox	So. Troy
E. Charleston Cry.	J. G. Turnbull Co.	E. Charleston	G. E. Morse	E. Charleston
Columbia Cry.	H. P. Hood & Sons	Charlestown, Mass.	Geo. W. Rumery	No. Troy
Northern Vermont Coop. Cry. Co.	Northern Vermont Coop. Cry. Co.	Holland		Derby Line
Shipping Stations.				
Newport Center Cry.	H. P. Hood & Sons	Charlestown, Mass.	Charles Hutchins	Newport Center
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	R. S. French	Barton
Westwood Farm Milk Co.	Westwood Farm Milk Co.	Charlestown, Mass.	Max Chamberlin	Newport
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.		Derby Center
Condensaries.				
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	E. L. Towne	Newport
RUTLAND COUNTY.				
Creameries.				
Proctor Creamery	Vermont Marble Company	Proctor	S. L. Harris	Proctor
Hortonville Cry.	Tait Bros.	Springfield, Mass.	F. L. Gidding	Orwell, R. D.
Champlain Valley Cry.	Tait Bros.	Springfield, Mass.	J. J. Jackson	Fair Haven
Otter Creek Cry.	Jones Bros.	Brandon, R. D.		Brandon, R. D.

Shipping Stations.

C. Brigham Station	C. Brigham Co.	Cambridge, Mass.	C. J. Wilbur	Wallingford
C. Brigham Station	C. Brigham Co.	Cambridge, Mass.	R. O. Bugby	Wallingford
C. Brigham Co.	C. Brigham Co.	Cambridge, Mass.	A. W. Needham	So. Wallingford
C. Brigham Co.	C. Brigham Co.	Cambridge, Mass.	F. E. Martin	Rutland
C. Brigham Co.	C. Brigham Co.	Cambridge, Mass.	H. C. Campbell	Danby
C. Brigham Co.	C. Brigham Co.	Cambridge, Mass.	C. L. Graves	Danby
A. Beckman	A. Beckman	New York City	Richard Durkee	Castleton
Castleton Dairy Co. Station	Castleton Dairy Co.	New York City	Henry Juckett	W. Pawlet
Maple Hurst Cry.	Tait Bros.	Springfield, Mass.	J. A. Wells	Benson
Tait Bros. Station	Tait Bros.	Springfield, Mass.	J. J. Jackson	Fair Haven
Berghorn Dairy Co., Inc.	Berghorn Dairy Co., Inc.	New York City	Amos Juckett	Fair Haven
Borden Station	Borden's Condensed Milk Co.	New York City	D. E. Decker	Poultney
Sheffield Farms Station	Sheffield Farms Co., Inc.	New York City	M. P. Leonard	Florence
West Rutland Cry.	George W. Lamphere	West Rutland	G. W. Lamphere	W. Rutland
Alden Bros. Station	Alden Bros.	Boston, Mass.	P. O. Eddy	Brandon
Orange County Milk Station	Tait Bros.	Springfield, Mass.	W. W. Smith	Brandon
Manchester Dairy Co.	D. Buttrick	Springfield, Mass.	A. B. Seward	E. Wallingford
H. P. Hood & Sons	H. P. Hood & Sons	Arlington, Mass.	Ed Cramer	W. Pawlet
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.		Cuttingsville

Cheese Factories.

Gleason Cheese Factory	J. L. Russell	Cuttingsville	W. E. Bruce	Cuttingsville
Union Cheese Factory	Union Cheese Co.	Middletown Springs	P. O. Wescott	Middletown Springs
West Pawlet Cheese Factory	C. H. Kinne	West Pawlet	C. H. Kinne	W. Pawlet
Riverside Cheese Factory	W. W. Jenks	Ira	W. W. Jenks	West Rutland
Cold River Cheese Factory	R. E. Plumley	No. Clarendon, R. D.	R. E. Plumley	No. Clarendon
Eureka Cheese Factory	Floyd Pratt	Middletown Springs	Floyd Pratt	Middletown Springs
Blakeley Cheese Factory	Frank Blakeley	Pawlet	Frank Blakeley	Pawlet
Mr. Holly Cheese Factory	George Woodbury	Cuttingsville	George Woodbury	Cuttingsville
Crowley Cheese Factory	A. W. Crowley	Belmont	A. W. Crowley	Belmont
Aldrich Cheese Factory	W. E. Aldrich	Cuttingsville	W. E. Aldrich	Cuttingsville
E. Poultney Cheese Factory	E. Poultney Cheese Co.	Poultney	George Baker	E. Poultney
Tarbleville Cheese Factory	W. E. Aldrich	E. Wallingford	Charles Waters	E. Wallingford
Spring Valley Cheese Factory	Spring Valley Cheese Co.	Middletown Springs	W. A. Bogart	Middletown Springs
Gilt Edge Cheese Factory	Gilt Edge Cheese Co.	Castleton	D. H. C. Lincoln	Castleton

WASHINGTON COUNTY.

Creameries.

Name of Plant.	Name of Operator.	Post Office Address	Name of Maker or Manager.	Post Office Address.
Marshfield Coop. Cry. Ass'n., Inc.	Marshfield Coop. Cry. Ass'n., Inc.	Marshfield	C. M. Lilley	Marshfield
Granite City Coop. Cry. Inc.	Granite City Coop. Cry., Inc.	Barre	E. J. Talbert	Barre
E. Montpelier Coop. Cry. Ass'n., Inc.	E. Montpelier Coop. Cry. Ass'n., Inc.	E. Montpelier	John Bond	E. Montpelier
No. Montpelier Coop. Cry. Ass'n., Inc.	No. Montpelier Coop. Cry. Ass'n., Inc.	No. Montpelier	E. C. Hillis	No. Montpelier
Northfield Coop. Cry. Ass'n., Inc.	Northfield Coop. Cry. Ass'n., Inc.	Northfield	W. J. Prindle	Northfield
E. Calais Coop. Cry. Ass'n., Inc.	E. Calais Coop. Cry. Ass'n., Inc.	E. Calais	Guy Bancroft	E. Calais
Cabot Farmers' Coop. Cry. Ass'n., Inc.	Cabot Farmers' Coop. Cry. Ass'n., Inc.	Cabot	T. J. Orne	Cabot
Warren Coop. Cry. Ass'n., Inc.	Warren Coop. Cry. Ass'n., Inc.	Warren	H. N. Faquette	Warren
Mad River Valley Cry. Ass'n., Inc.	H. W. Belden	Waitsfield	H. W. Belden	Waitsfield
Worcester Coop. Cry. Ass'n., Inc.	Worcester Coop. Cry. Ass'n., Inc.	Worcester	R. B. Montgomery	Worcester

Shipping Stations.

C. Brigham Co. Station	C. Brigham Co.	Cambridge, Mass.	M. C. Washburn	Waterbury Ctr.
C. Brigham Co. Station	C. Brigham Co.	Cambridge, Mass.	M. C. Washburn	Waterbury
Mark Moody Station	Mark Moody	Waterbury	Earl Seaver	Waterbury
Moretown Cry. Station	The Bryant & Chapman Co.	Hartford, Conn.	F. H. Sayer	Moretown
Middlesex Cry. Station	The Bryant & Chapman Co.	Hartford, Conn.	L. B. Palmer	Middlesex
Montpelier Cry. Station	H. P. Hood & Sons	Charlestown, Mass.	Harry Colombo	Montpelier
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	C. E. Bixby	Barre
Plainfield Cry. Station	Robert M. Burnett	Southboro, Mass.	E. J. Bartlett	Plainfield

WINDHAM COUNTY.

Creameries.

Windham Co. Coop. Milk Producers, Inc.	Brattleboro	W. P. Frost	Brattleboro
Belhows Falls Coop. Creamery, Inc.	Belhows Falls		Belhows Falls
North River Cry.	Jacksonville	F. A. Rist	Jacksonville
Deerfield Valley Cry.	Wilmington	L. H. Higgins, Sec'y	Wilmington
Windham County Cry.	Newfane	J. E. Gleason	Newfane
Wardsboro Cry.	Wardsboro	C. Sorenson	Wardsboro
Guilford Coop. Cry.	Brattleboro, R. D.	R. R. Holbrook	Brattleboro, R. D.
Holbrook Cry.	Townshend	Harry Sparks	Townshend
West River Cry.	So. Londonderry	A. M. Lovenberg	So. Londonderry
Canoe Brook Farm Cry.	Putney		Putney

WINDSOR COUNTY.

Creameries.

Elm Valley Cry.	Belknap & Sons	D. H. Belknap	Cavendish
White River Valley Coop. Cry.	White River Valley Coop. Cry.		Rochester
Ass'n., Inc.	Ass'n., Inc.	R. H. Holland	Stockbridge
Maplehurst Cry.	J. H. Mussey	J. H. Mussey	Barnard
Silver Lake Cry.	F. E. Allen	F. H. Adams	So. Royalton, R. D.
Moore's Cry.	E. F. Moore	E. F. Moore	Bethel (Destroyed by fire)
Harrington Cry.	Ayer & Ferson	Ayer & Ferson	No. Pomfret
Sherburne's Cry.	A. E. Sherburne	A. E. Sherburne	Sharon
Sharon Coop. Cry.	Sharon Coop. Cry.	W. C. Porter	W. Hartford
West Hartford Cry.	A. L. Dow	A. D. Lynch	So. Royalton, R. D.
Sylvan Glen Cry.	F. C. Putnam	F. C. Putnam	

Shipping Stations.

Name of Plant.	Name of Operator.	Post Office Address	Name of Maker or Manager.	Post Office Address.
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	R. A. Wells	Woodstock
Whiting Cry. Station	D. Whiting & Son	Boston, Mass.	F. D. Jackson	Hartland 4 Corners
Whiting Cry. Station	D. Whiting & Son	Boston, Mass.	L. W. Hitchcock	Acutneyville
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	R. J. Patteson	Norwich
Child Bros. Cry. Station	Child Brothers	Waltham, Mass.	A. C. Cripps	Brownsville
Manchester Cream Co. Station	Manchester Cry. Co.	Windsor	J. A. McGuire	Windsor

Cheese Factories.

Plymouth Cheese Factory	Plymouth Cheese Co.	Plymouth	E. C. Aldrich	Plymouth
Nickles Hopsas Cheese Factory	Nickles Hopsas	East Barnard	Nickles Hopsas	So. Royalton R. D.
Weston Cheese Factory	Peter John	Boston, Mass.		Weston

Where no other state is mentioned, the address is Vermont.

The condensaries are counted with the shipping stations because they often ship milk and cream. All those plants which have one or more large vacuum condensing pans are listed as condensaries. Several of the creameries ship milk and cream at odd times and several make some cheese. A number of the shipping stations also make butter and cheese. The cheese factories often make a little butter and ship milk and cream.

NINETEENTH ANNUAL REPORT
OF THE
VERMONT STATE
Horticultural Society

PROCEEDINGS
OF THE
TWENTY-FIFTH
Annual Meeting and Exhibition
HELD AT RUTLAND, VT.
NOVEMBER 17, 18, 1921



ST. ALBANS, VT.
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1922

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PRESIDENT'S ADDRESS

C. L. WITHEREL.

This is our third successive meeting and show held in this city.

The Rutland Board of Trade asked us to come again, and you may be sure the many courtesies extended us last year prompted us to accept their invitation.

I wish to extend to the Board of Trade our appreciation, and I assure you we will endeavor to make this meeting pleasing and instructive to all attending.

This is also the twenty-fifth anniversary of the Society, which was organized in 1896 by a small bunch of enthusiastic growers. Altho no great strides were made during the first half of the society's existence, the latter half can boast of many commercial plantings of fruit ranging from 500 to 35 or 40,000 trees. In almost every instance these orchards are being cared for in a scientific manner by men who know how.

To be sure many of us suffered from frost the past season, which ruined full crops for a few, however, we are anticipating a bumper crop in 1922, and I believe without exception, our growers have faced the loss bravely, and have made ready for something good a year from now.

It is pleasing to know that a Vermont grower recently had the honor of winning first prize on a box of McIntosh at the N. E. Fruit Show held at Concord, N. H., and I believe the show management presented that box of apples to Marshall Foch a few days ago at Boston. So you can see Vermont apples are still at the front.

Those of you who watched the markets this fall, have seen Vermont barreled apples bring \$12 to \$15 per barrel along with Western quality boxed apples at a lower average.

We know the Western apple has gained ground by wide advertising, we know the Eastern growers have not advertised, therefore there must be but one reason why Vermont apples are beginning to lead, and that is, quality fruit arriving on the market in prime condition.

While it is one job to grow good apples, the market end should not be forgotten. It takes but little variation in pack and quality when fruit is opened up for sale, to make a dollar or more difference in selling price, so let's not forget the market end and what it means on a thousand or more barrels.

As long as we are not organized, I would suggest that every grower do individual advertising. Rewards are bound to come when the trade finds out your stock is good.

THE SEEDSMEN AND NURSERYMEN AND THEIR CUSTOMERS.

GEORGE W. PERRY, CHESTER, VT.

The seedsmen and the nurserymen on the one hand and the gardeners and fruit growers on the other hand are really copartners in the great business of supplying a large part of the food of the human race. To the growers of fruits and vegetables it is of the utmost importance that seeds and plants should be intelligently, carefully and honestly grown and sold, while to the growers of the seeds and plants for the market it is of equal importance that they should be intelligently, carefully and honestly planted and cultivated. The gardeners and fruitgrowers could in a way get along without their copartners, as they did for thousands of years before seed and plant growing became a great business, a development of quite recent times. But the seedsmen and nurserymen are wholly dependent upon the purchasers of their goods. About seventy years ago, when I was a small boy in Massachusetts, the traveling nursery salesman came out in full bloom in most gorgeous colors, such as Nature could never produce. Grafted fruit had just taken the world by storm and every vacant lot was set out to a very great variety of fruit that glutted the market as soon as it came into full bearing. Many kinds were attempted that have since been largely discarded. Peaches and quinces were in every village yard, while apricots and nectarines were often seen. Many of those traveling agents were unscrupulous and so were some of the nurseries which they represented, while often the stock they sold was worthless, but the past generation owes them a very great debt of gratitude.

There are several criticisms of the seedsmen which the gardener naturally makes.

1. To the amateur gardener there is not given in the retail catalogue sufficient information about the varieties offered nor plain enough directions for planting the seed and growing and harvesting the crops. For instance not a hint is given that the apparently sterile blossoms that first appear on squashes, cucumbers and all others of that family, are just as necessary as are the others that have the small fruit attached. So people call them "false blossoms" and bemoan their appearance and sometimes destroy them. Fortunately they do not pick off all of them or they would have an Adamless Eden for the race of squashes. No one's

attention is called to the fact that corn has two kinds of blossoms, the ear being the pistilate or female blossom, while the tassel bears the staminate or male flowers, as the pollen is carried from one to the other by gravitation or the wind, insects not being necessary, the blossoms have no bright colors. But if the hills are in one long row, or even two rows, and at blooming time the wind blows across the row, then the ears will be more or less bare of kernels. By putting out onion sets in early spring large bulbs may be had by the first of July. But, if the amateur tries them out, he finds that two thirds of them will run up to seed, forming at the root only small, hard, woody knobs. Why does not the seedman tell him to pinch out the flower stalks as they appear, and then the onions, having no children to raise, like a childless couple, can spend all their substance on themselves and grow large and succulent.

2. The descriptions of the different varieties of any particular sort of vegetable are not explicit or determinate enough. Three or four will each be described as "the earliest, the best and altogether desirable," leaving the novice in the dilemma of the small boy in the big toy shop, wholly unable to choose. If there are any outs about any variety, the catalogue is very careful not to mention them, a method that is considered all right in a horse trade.

3. Some seedsmen continue to offer for sale varieties that are very poor in quality, and that were surpassed years ago by much improved sorts. These inferior kinds are described in such a way that the novice is very likely to select them rather than the better kinds.

4. Seedsmen often send out seed that they know, or ought to know, will not grow; or, if they grow, will not produce good crops.

The fruitgrower may also criticise the Nurseryman.

1. Though he does give very good directions generally about setting and caring for the plants and trees, yet he does not give correct information about the varieties he offers for sale. As used by him the word "Hardy" has no significance. In no catalogue do I find any mention of the need of bees, without whose aid no fruit can be grown. He does not tell his customers that certain sorts, for instance the Bartlett pear and the Spitzenberg apple, are self sterile and must be planted alongside of other varieties to produce fruit. Several nurseries tried to introduce the Russian apricot, a most delicious fruit. But they neglected to tell their customers that they were self sterile and that two or three varieties must be planted together, and so they have not been a success.

2. The descriptions are not correct as to the quality or size of the fruit, or hardness of plant. The Ben Davis is sometimes described as "tender and juicy", while the smallest apple is described as medium sized and the medium sized apple is called large.

3. Some nurserymen continue to grow, advertise and sell poor stock, often diseased or infected; and worse than that things that they know are utterly worthless, especially true of novelties that they offer at most exorbitant prices. There used to be a man making a specialty of this sort of thing, every year presenting some marvelous discovery, extravagantly advertised and praised in his flamboyant catalogue. I remember the Tree Blackberry, The Great Japanese Wineberry and The Wonderberry, all of them utterly worthless. I doubt if a single plant of any of these can be found growing in length or breadth of the land.

THE NURSERYMAN AND HIS CUSTOMER.

GEORGE D. AIKEN, PUTNEY.

The purpose of this paper is not to provide an alibi for the nurseryman in his far too many controversies with his customers, nor will it be an arraignment of nursery stock buyers. The horticultural world has not been the gainer from the general impression that the nurseryman is out to "do" his customers. I acknowledge that there are crooked nurserymen who cheat honest customers and submit that there are some customers who are proud of the fact that they have at some time or other gotten something for nothing from a nurseryman. To them a nurseryman is as legal picking as the railroad or express companies and if their order is duplicated by mistake, or if a small customer's tags get on a big customer's order of trees or plants, what's the use of saying anything about it.

If there are any two groups of persons who should work together for a common purpose it is the nurseryman and his customer. The purpose is to produce trees, plants, shrubs, vines, and roots of good quality, up to the grade of which they are sold, true to name and dug and packed to reach the planter in the best condition possible.

This can be accomplished only by the customer frankly telling the nurseryman if he is dissatisfied with the stock and for what reason.

Three weeks ago I received a letter from a man in

Amherst, Mass. who said "a man told me that he had received diseased plants from you, but on the advice of the Mass. Agri. College I am sending this order to you." I tried unsuccessfully to find out who told him this. If whoever told him this had written me, telling me the nature of the disease, what the stock was and when it was received it might have been possible to have traced the disease to its source and eradicated it. On the other hand this man may have planted healthy stock on diseased soil, he may have bought it from some other nursery or it may not have been diseased at all. At any rate he confined his activity to telling his neighbors instead of me even tho he could have obtained a satisfactory adjustment by so doing.

The principal complaints received by a nurseryman from his customers are 1. Stock fails to grow. 2. Stock is not of satisfactory quality. 3. Stock is untrue to name.

Our own complaints are practically all of the first group. Failure of stock to grow, I believe is more often caused by some agency outside of the control of the nurseryman. It may be caused by exposure at digging time, imperfect storage facilities or improper packing. But if it has been properly dug, stored and packed, and delivered to the transportation company, then the nurseryman has no further control over it.

Now, one of the greatest dangers to which the customers order is exposed is delay or damage in transit. We very often get complaints like this one from Conn. "Trees arrived today badly dried out as you did not wet the packing." This letter was received in June and investigation showed that we had shipped them in early May. A shipment of strawberry plants to New Jersey was smashed only as express passing thru New York City can be smashed. The customer was not pleased. We sent him another shipment, and this too was hardly recognizable on its arrival. By this time he was disgusted with our methods of doing business. Keeping my courage, I sent him a third shipment, this time by mail. It reached him safely and he was so pleased with our methods of doing business that he sent another order by return mail.

Whenever a shipment is damaged by delay or injured in transit, we have no difficulty in collecting the amount from the express company. While we do not assume any liability after delivering the shipments to the express or other transportation companies, we almost invariably enter the claims for the customer. Despite reports of many persons, we have found the express company very fair and prompt, usually settling claims as soon as the necessary procedure

can be gone through. In the seven years we have been shipping plants we have had only one claim rejected and this was where the express company notified the customer by mail of the arrival of the plants. There were two men of the same name in the town. The wrong one got the notice and kept it and in the meantime the plants spoiled.

I believe that the nurseryman and transportation companies together are not responsible for half of the failures of plants to grow. The customer is responsible for most of the failures. And the greatest of his faults is neglect. Our good friend Luther Putnam told me of one of my shipments that lay in the customers woodshed two weeks. They were strawberry plants too. Investigations of certain complaints have shown that many shipments have lain in the express offices unreasonable lengths of time, before being called for.

Usually, we ask complainants to advise us as to how long after being received the stock was planted and quite often that is the end of the claim.

Many failures of the stock to grow are due to the ignorance of the planter. A very common mistake is that of putting strong fertilizer in the holes where the trees or plants are set and where it comes in direct contact with the roots. I have known of instances where even dead animals have been put in the holes.

Where fall planting is practised, the trees and plants should not be cut back until the following spring as the frost might enter the wounds and cause winter injury or death of the trees. Also, the soil should be drawn up about the base of the tree.

Then again, we sometimes get complaints of failure of stock to grow where it is simply a case of the planter being impatient, and does not wait for it to start. A great many write that their Wistarias and Altheas failed to grow, when, as a matter of fact, these plants do not start growth till into June of the first season planted. I do not believe that we have sold a single Wistaria or Althea that did not start after sufficient time had been allowed.

Often, I have known of trees and plants lying exposed to sun and wind for excessively long times. They are set in dry times without water, they are set on land where water stands all the time, and they are set on land where no self respecting tree would consider choosing a home. And if they die it is so very easy to blame the nurseryman.

As proof of the statement that most failures are due to the customer's ignorance or neglect is the fact that very few complaints are received from experienced planters, but that

nearly all come from the amateur growers who send the small orders. In my experience the two extremes have been the customer who bought two plants and reported four of them dead, and the West Virginia customer who reported that out of an order of 6,500 plants every one grew, altho they had been two weeks en route. One was the amateur, the other the experienced grower. There is a vast difference of opinion among our customers as to what constitutes a good stand of plants. We get some nice testimonials from customers who get an 80% stand, while others will actually "rise up on their hind legs and claw the air" if 3% die. The nurseryman gets a good insight of human nature.

The second cause of complaint, that of stock being unsatisfactory, gives us very little trouble. If, however, a planter receives stock from a nursery, and it is not up to grade or is diseased or in poor condition he should advise the nurseryman at once. Unsatisfactory stock should not be planted as it will not be likely to improve in quality.

The third cause of complaint, stock being untrue to name, gives us practically no trouble. We receive only about one complaint a year from this cause, and it has in all but one case been only a slight mixture. Most stock that proves untrue to name has probably been mixed in storage. Very few nurserymen nowadays will deliberately mislabel stock.

In summing up I will say that both the nurseryman and his customer have obligations.

The customer should do these things.

Order early and expect to pay a fair price. If he buys at less than production cost, he invites trouble.

He should advise the nurseryman on receipt of goods if they are not satisfactory.

He should care for the stock carefully, and at once on receipt.

He should attempt to make adjustments with the nurseryman, instead of knocking him to his neighbors. Possibly the nurseryman might not be to blame.

The nurseryman should not do these things:

Cut crown gall off fruit trees and paint wound with mud to conceal disease.

Ship stock that is cheaper grade than the customer paid for.

Reintroduce old varieties under new names at higher prices.

Offer unworthy varieties for sale.

Misrepresent varieties.

Charge unreasonable prices.

In closing, I will say that good feeling between the nurseryman and his customer is more desirable than rules and regulations. The nurseryman is now restricted by hundreds of regulations; some are necessary, some are not. Visit the nurseries.

And the nurserymen should visit the growers and their meetings. We are working for common results, better varieties, better stock, better growing methods, better places to live and better feeling toward each other.

CHAMPLAIN VALLEY, THE BEST APPLE PRODUCING SECTION IN THE WORLD

VERMONT'S GREAT OPPORTUNITY.

E. N. LOOMIS, VERGENNES.

The Champlain Valley is the greatest apple producing section in the world,—greatest in its possibilities and best adapted to growing the best quality. This fact has been confirmed by opinions from many experts in the apple industry, including Professor Samuel Frasier, superintendent of the Wadsworth Estates in Geneseo, N. Y., and every large apple merchant in the country. Strange to say the Vermonters alone but little value this fact and are indifferent to the possibilities of wealth presented by this great opportunity.

Champlain Valley has every attribute for the highest production of the apple orchard; hardy climate, a loamy clay soil, good drainage, an evenly distributed rain supply. There is little danger of late spring frosts on account of its northern latitude; also the great Lake Champlain itself has a very beneficial influence in this respect.

The finest Greenings in the world are grown here and Greenings today are the most valuable of all apples. Other marvelous varieties are here grown to perfection such as the Northern Spies and the McIntosh. This year these varieties from Vermont have sold from \$10.00 to \$14.00 a barrel in the New York City market. They have averaged a net return to the farmer from a half dollar to a dollar a bushel more than the best apples from the States of Oregon and Washington. Vermont apples have, due to the very high freight rates imposed on the Western box apples, netted back to the Vermont growers \$2.00 to \$2.50 a bushel, as

compared with a dollar a bushel net to the growers in the Northwest.

With the same culture, orchards in Lake Champlain valley are as healthy and as beautiful as in any section of the country and produce as clean, large, beautiful fruit as the much talked of apples from Hood River or Wenatchee, Washington.

Apple merchants know this but Vermonters have little faith and are slow to act. Why do the Vermont farmers or business men hide their talent or neglect the opportunity to gather in the hundredfold or thousandfold return, an orchard investment may so easily and surely earn?

After living in Vermont for ten years and after having produced an orchard of one hundred acres at West Addison, Vermont, which is proof of the statements I have made, I have come to the conclusion that the fault does not lie with the farmer but with the peculiar state government under which he lives. Appreciating the beauty and wonder of Vermont even as much as its own citizens, I state only the most apparent facts when I say that Vermont has been slow to meet its opportunities. In spite of marvelous resources, through the propagation of orchards, through the dairy industry and through the development of its marble and lime quarries, it is the only state in the Union whose population at the last census was less than the census ten years preceding. No state in the Union, certainly none in the northeast has such bad roads and in no state, does a farmer receive less help or less consideration from the state government than the farmer in Vermont. It is a case of each man for himself and the devil take the hindmost. There is but little cooperation between the workers of any industry and there is absolutely no cooperation between the state Legislature and the farmers. Vermont has prided itself on being a Republican state when in reality its misfortune lay in only having one party within the state. All competition or rivalry in state progress has ceased with the election. The only competition in Vermont politics lies in obtaining the nomination and when that has been won there is no incentive to legislative or industrial progress.

Then again the government of Vermont has greatly favored the cities as compared with the country districts. Cities contain practically the only Macadamized or stone or concrete roads in the state. To be sure, during the last year by reason of obtaining a considerable amount from the United States government for road building Vermont has expended the sum of two million dollars on better roads. It has scattered, however, this expenditure in small allotments

to many localities and there has been no general or large plan for building good roads throughout the state.

3. The wiser course would be to develop the agricultural interests of the state and the cities would grow to take care of the growing business and increasing wealth of the state.

Compare the development of the Lake Champlain valley, one hundred and seventy miles in length, with the stretch of land in New York State from Buffalo to Syracuse, approximately the same distance. That section in New York contains a succession of orchards, one on every farm, from ten acres to forty acres on the average. It produces fifteen million barrels of apples in a favorable season. It has cold storage houses with a capacity of eight million barrels. It has many cooperage shops for manufacturing barrels, it has plants for manufacturing the by-products of apples, canning houses and plants for making dried apples. Vermont has not a single cooperage shop let alone canning factories. It is high time we had a political party in office to care for the farmers' interests and with such a party this might be its platform or policy.

First, GOOD ROADS, not simply trunk lines for autos to pass through the state but good roads reaching from such trunk lines to all farms.

Second, ENCOURAGEMENT TO AGRICULTURE and especially to apple orchards.

In New York the State furnishes free to all land owners young pine trees if they will but plant. The yearling apple tree costs no more to grow or propagate than the yearling pine tree. How great an impetus to the apple industry, if the state would offer free to all the farmers all the apple trees they would plant.

But whether with encouragement of the state or without, the fact remains that no farmer in Vermont need be satisfied with a bare living from his farm. Plant an orchard as large or small as you can yearly cultivate and you will insure prosperity to your old age and to your family after you.

REMARKS BY E. S. BRIGHAM

E. S. BRIGHAM, ST. ALBANS.

Mr. President, Ladies and Gentlemen: I suppose when one comes to have gray hair like I have, that a word of reminiscence is pardonable. My connection with the Vermont State Horticultural Society began in 1904, seventeen years ago. The first meeting I attended was at Vergennes that winter. I can see present here this afternoon a few men who were present at that meeting. One is our old friend George W. Perry who I know you all hope, as I do, will be here for fifty years more. I think it was at our 1905 meeting that the late J. H. Hale of Connecticut gave us a very inspiring talk during the course of which he said, if I remember correctly, that in Vermont there were some of the best apple lands in the world and I recall that as he went on and described the locations, an old gentleman with a long yellow beard who sat down in the audience interrupted Mr. Hale and said that it was a good deal better than the conditions in Florida and Mr. Hale said, "I suppose you have been there, haven't you?" and the old gentleman said, "Yes." "Well," Mr. Hale said, "You know what the conditions are, then you had better stay up here. Just trim up your whiskers a little and you will be all right." Only Mr. Hale could have taken such liberties with a stranger and gotten away with it.

During these seventeen years, I feel that we haven't made the progress we ought in utilizing these apple lands of ours. I haven't seen the report of the last census as to the number of bearing trees, but I venture to say that we do not have today in the State of Vermont as many bearing apple trees as we had seventeen years ago. Is that true?

The reason for that is the passing of old farm orchard trees which were set out primarily to furnish a family supply of apples. Those growers were not really growers of apples but simply pickers of apples. When nature was kind enough to give them a crop they went out in the field and picked them. Now, a considerable part of the fruit supply of the country used to be derived from orchards of that kind. Whenever conditions were favorable so that anybody could raise a crop of apples, why, then we had a tremendous production from those old farm orchards, but our invasion of tent caterpillar a few years ago hurt those trees for two

or three years and weakened them very perceptibly. Then the cold winter of 1917-1918 came on and practically finished many of the old trees, so today the old farm orchard is not the factor that it was once in the fruit supply of the country.

Taking its place, we have the large orchard plantation. Men are now making a business out of apple growing,—men like Mr. West, Mr. MacRae and others. Now, I think that we might well have more of the old farm type of orchard, not just exactly that old type, but I think many of our farmers would find it very profitable to put out five to ten acres of orchard. Give the trees good care and form cooperative associations for grading, packing and marketing the fruit. I think on this basis orcharding would be one of our most profitable money producing industries.

Now, the State Department of Agriculture has to do with horticulture in a way, in that it is charged with the responsibility of protecting the State against the introduction of new and unusual insect pests and fungus diseases. A few years ago we had on the east side of the State a very serious infestation of the brown tail moth. Owing in part to the patrol measures and in part to the very cold weather, that insect has practically been exterminated. I think last year there was not a live nest found in the State. We have, however, a very serious infestation of the gypsy moth. The Federal government and the State are going to do everything possible to exterminate that insect but owing to the War, the increased cost of labor, the preparations made by the Federal Government to keep the insect in control did not go as far as usual so it made a very rapid spread. Now, whether or not it would be possible to exterminate that insect from Vermont, I don't know. It is going to cost a great deal of money. In Massachusetts it has done a lot of injury. Commissioner Wheeler can tell us perhaps how many millions of dollars the State of Massachusetts has expended.

MR. WHEELER: "The state itself, not far from ten million dollars and private parties have expended at least ten million."

So that you can see it is a serious thing and we ought to take every precaution to keep it down. I hope we shall be able to do so. There was an outbreak of the San Jose Scale in Brattleboro. It did not seem practicable under the circumstances to try to exterminate it but to hold it to the area which it occupied and I think that has been done. These are the insect pests with which we are now concerned.

I see that you have no potato exhibit here today. Luther Putnam always brought a potato exhibit to the Horticultural Meeting. He had a sort of potato menagerie on his farm, something like a hundred varieties of potatoes and he always came out with a large exhibit and captured the prizes offered. One year when the United States Bureau of Plant Industry had a variety test on my farm of something like a hundred varieties, Professor Stuart and I laid a plot to take the prizes away from Mr. Putnam in the exhibit of potatoes.

Now the Department of Agriculture is trying to establish the certified seed potato industry in the State and that is an industry which works very well with orchards. A man who puts out an orchard plantation, if the land is well suited to the growing of potatoes, can very well grow crops of potatoes between the trees for a few years at least.

The potato is very sensitive to heat and is very susceptible to a great number of diseases and these diseases multiply much more rapidly in a warm climate. For that reason potato growers in the States to the south of us find it necessary to come north for their seed. I think experiments even so far north as Massachusetts have shown that northern grown seed yield over 100 bushels per acre more than the home grown seed.

If a man can become skilled in potato growing and control these diseases, the seed potato growing industry offers an opportunity for a very profitable income and I would like to have you apple men consider going into that industry. I don't want to picture it to you in such glowing terms that you will think it is any get-rich-quick proposition, because it isn't. It requires almost eternal vigilance to take a crop of potatoes through the season and have it pass the certification and keep it free from these diseases, but if you can do it, the profits are very good.

Now I am taking the time from Commissioner Wheeler and I know you are all anxious to hear him. I am very glad to have an opportunity to be here this afternoon and I hope next year that you will go back to the old-time fruit exhibits which practically cover the whole walls of this room.

COOPERATIVE WORK IN GROWING AND MARKETING FRUITS

BY WILFRED WHEELER.

Mr. Chairman: I am only glad to come up here today and tell you a little of our experiences in the work we are trying to do down in our section. I suppose you all saw in the paper yesterday and this morning a decision by the railroads throughout the country to reduce freight rates 15% with the exception of New England. I could preach quite a sermon on that question, because New England is excepted in many of the big decisions, particularly those affecting the farmers and this railroad rate only affects the farmers because it is only for farm products. That places against New England a tariff wall which New England has got to stand. For instance, a shipment of farm products originating in New York comes into New England with that 15% reduction, so that we have got to pay the extra 15% where the New York people get the benefit of that reduction.

I feel that's wholly our fault. A great deal of this country is organized. The farmers are organized in it so that they have a voice in what goes on in the country and if there's any decision in Washington relative to their interests they have a good deal to say about it. They have someone down there to tell the Government and the people there how they feel about it, and New England is very seldom represented by an organized body of farmers. I think New England is the last section of the country that's going to cooperate as a whole. It's simply because the New England people are mighty independent. They hate to feel they are dependent on each other in any way and it's due to conditions surrounding us and if you want to follow it briefly through, the condition that has imposed this independence on us is the fact that the farming that's left is conducted around the big cities where we have an easy market and that is the type of farming that's been left in New England, but if we are going to develop New England the city people have told us to raise stuff so that we can get ahead. If we are going to do that we must think about those sections of New England which must be developed.

There has been very little done cooperatively. The things that force cooperation never come easy. It's always a forced thing. Somebody gets knocked in the head so hard

he feels he has got to do something and a group of farmers get together and they cooperate. That's the history of cooperation, the world over. They get put out of business some way and they get together to see some way out. It's that way the world over, in New England and elsewhere. You can take that illustration of Denmark. They sent its population out of the country and they came here and made the best citizens. In 1875 Denmark was bankrupt so far as agriculture was concerned and then they became that wonderful source of cooperation which has brought Denmark to the front.

Now these instances can be multiplied all over the world but they all get back to the question of necessity of being forced to do it, of not looking ahead far enough to grasp what's coming and taking advantage of the opportunities we have at the present time to get together and forestall this thing.

I feel that the whole thing I want to impress on you today is a question of doing this and doing it now and I am going to try and tell you a little about what we tried to do in a section in our State which I think is so far in advance, not because I came from there or because I went there and helped out a little in the problem, but because I think it presents to you an example of what can be done anywhere.

We have in New England several outstanding points where agriculture is known throughout the country. You don't need to say anything about Aroostook County; it means potatoes. You don't need to say a great deal about the Champlain Valley because it means certain things to certain people. We have a few outstanding places in the New England States which mean something. They mean something because in those sections certain things have been developed and shipped in large quantities. As a matter of fact we have a dozen or hundred other such places coupled with the same development if we will only grasp the opportunity.

Cape Cod brings to the minds of most people cranberries and there is an industry built out in that little section of the country which is probably the best organized, the most beautifully organized group of farmers I know anything about. In that section the cranberry growers were in the position that the farmers of Denmark were 15 years ago. They were practically getting nothing for their crop. Their crop was being largely disposed of in the Boston market but the growers made no money so they got together and formed an industry. Now the cranberries are going to be produced more or less in Oregon and Washington and

I don't doubt but what they will get together. There's a section where the cranberry industry has shown what advertising can do in cooperative effort. I was just reading the figures of what one town did last year. The organization there spent \$60,000 in advertising alone. You wonder where they got that money? They got that money simply by putting a tax on every barrel or box of cranberries that went through that Association's headquarters. They raised that money without the people knowing it. It wasn't as if the man paid back so much to the Association, it was taken out in his sales and that money is used for advertising and the result is that in Massachusetts only 4-10 of a pound of a pound of cranberries is used per capita while in the cities and towns of Illinois over 15 pounds per capita is used. That's done by advertising. They push the crop away from the congested markets and have spread it over the United States so that they have a representative on the Pacific coast. I say it can be done with any product. It's simply a cooperative effort backed by men who are willing to put in their time; are willing to be taxed for the advertising. You would be surprised to see what a live society of men they are. They not only do this advertising, get together on meetings but they forced the State to put down an experiment station in cranberry growing. They couldn't have got enough effort in the State House to get them to do any work for them but cooperatively they went and got it and that experiment station begins by having a weather bureau there and telephones out to each man's house when there are storms coming. It warns them against the insects that are liable to come in more this year and can tell exactly when these insects are likely to appear. They have also experimented for the use of poison and sprays for these insects and for diseases which the cranberry has and one of the most interesting experiments has been with the use of bees. Now individually some man might have struck that. Individually they might have found it out after a while, but now they have all found it out and are all working on it. It seems to me that we in New England are too much afraid of over producing things; that we are going to flood New England with apples and ruin the apple business but apples are higher than ever and the average year when the country is prosperous, apples are going to maintain an average price.

I believe if it is done with this idea of proper distribution and of growing a high quality in sections, you are going to be up against this. I feel that the problem of increasing our areas, of getting together, because of our ideas

in getting together, we are going to increase the demand for these things. We are going to spread them over a greater area of the country and get just as good returns as we did before. The cranberry interests have not stopped building bogs. They have been building bogs until the War stopped them and you are going to see every inch of that cranberry bog section developed. Because they are a bright minded set of men, they are going to do that. They have had their troubles. Individually I do not suppose there was a pound of fertilizer used by the growers until about eight or ten years ago. They had no idea that cranberry bogs were ever run out. They thought it would last forever and they kept on with their bogs and wondering why they did not get cranberries. They built the bogs up higher and got new roots but our experiments showed that the use of nitrate of soda and a little potash applied at the root, was almost sure to produce a crop double of what we had been getting but that was the result of cooperative work. That result showed wonderful returns to the men that were doing it.

Here is a thing that's rather interesting, although I don't approve of it. At the time the United States Government was interested in establishing a standard barrel, the cranberry interests were so strong in their declaration that they did not want the cranberry barrel changed that they were able to influence the Washington government to keep a separate standard for cranberry barrels. I do not approve of that but that simply shows you what a group of men organized in Massachusetts were able to do.

Now I want to tell you the story of another organization because I have been interested in that a little more than in the cranberries. The other part of our work has been connected with a group of men who came to this country about fifteen or twenty years ago. These people came to the United States largely as deck hands on boats that run to New Bedford. Most of them had little farms in their own country but you can imagine what a farm there might be as compared with our propositions. They practically knew nothing of farming. They settled in this section of Massachusetts and gradually worked into this section through here and from twenty years ago until the present time they have increased considerably so that south of Falmouth we have something like 200 small farms not over ten, fifteen or twenty-five acres in area. These men originally, came in and took up land which had never been farmed so far as anybody knows. Originally the Pilgrims, rounding the Cape found the land occupied by the Indians where the Indians were growing crops of corn, but the

Pilgrims were not farmers. They came over here looking for something easier than farming and the farmers that came over from Europe later went West immediately, working in through Plymouth and west of Boston, so that this great section of the Cape was left unoccupied so far as agriculture was concerned with the exception of the gardens carried on by the fishermen and their families along the Coast. So that these people came in and picked up various small crops, among them strawberries and that became their real crop, so that 15 years ago you would see every farm from a quarter of an acre up to an acre of strawberries. They increased their work because the market was taking the berries until the season of 1913, 1914 and 1915 when the strawberry business, owing to the poor handling of the crop, left these men practically stranded and their farms, small as they were were mostly mortgaged and they were in a desperate situation. Most of them wanted to get out of the country. They were like a good many of us, like these western land booms where something falls out of the bottom and the people want to get out of the country, but in 1915 they initiated the movement of getting together and they asked us to come down and talk to them about it. So we went down and got them organized and we got that first year about 75 men to join, representing about eighty acres of strawberries. We had a very poor year that year but nevertheless made a little money for these people.

The trouble with New England farmers is they buy at retail and sell at wholesale. For instance, one item alone, they were paying previous to 1915, \$14.00 a ton for ice for their cars; paying 35c a crate to get their berries hauled from the Railroad to the market and paying half of that to get them hauled from their farms to the station and everyone was paying individual freight rates on every shipment he made. He wasn't getting advantage of a carload rate, so you can imagine what the railroad was getting out of the shipment of ten or fifteen carloads and you can imagine the congested condition of the market; each shipping under his own name, the most unpronounceable names in the world. That year we saved them money on everything they bought. We bought their crates for them by organizing and getting the crates by the carload, and everything else they bought, so that they cheered up that year and put a little money in the bank. In fact their land produced better than \$150. an acre profit, and here we have six reasons of cooperative effort and we have the exact figures here on every year's work and it shows the

advantage of the thing. From six cents a quart in 1915 when they shipped almost 800,000 quarts of strawberries, to twenty-two and a half cents for 1921 when they shipped about 700,000 quarts. It shows not entirely an advance, because the market has changed, but it shows the fair advance due to their cooperative effort, because every year we have saved them almost one-half on the cost of doing business. We cut the cost of ice from fourteen to five dollars a ton. We cut the cost of carrying berries to the city from thirty-two cents to eight cents. It is interesting to know the improvement in the quality of the fruit and this is one of the things we have got to be careful of: that you are not going to be successful cooperators by growing a hundred varieties of anything. We had the advantage because the farmers grew mostly one variety of strawberry, but any cooperation must make up its mind to grow one thing and nothing else, and I trust that if anyone does start a thing of this sort he will concentrate on one variety. We did it down there with one variety of strawberry. It had the advantage of being small and dry and firm and sweet and would ship well. This year our crop, estimated at about six hundred some odd thousand quarts, was distributed in six different cities in the New England states. Boston got very few of them. We sent some to Montreal. We have shipped them to Bangor, Maine and Albany, New York and as far as Buffalo. We have the advantage there by cooperative effort of picking under one organization, of selling under one organization and of distributing to wherever the market is good.

Just to give you an example of how our part is handled, the farms are small farms, very seldom over one acre of strawberries, sometimes two. At the beginning of the season the association meets and appoints an inspector. He goes around over the fields and gives the market in Boston an idea of what to expect. We may have three or four varieties and he will give them an idea of what to expect this year, so that he has got something to go on as to what's coming. Then, as the berries begin to ripen, we start loading carloads. Everything is brought down to that carload by the men in the evening. The berries are loaded between seven and five o'clock and iced well if it needs it, and when that car is loaded we telegraph to the Boston man and tell him what we have got, what it is and what does he want done with it. If he says ship it to Boston, it goes there or wherever he says. That is the simple way of handling it. At the car we have an inspector who looks

over those berries as they come in and designates them as ones or twos.

Let me show you what happens under cooperation as affecting the quality of the fruit. In 1915 there were in all a total of something like eight hundred thousand quarts of berries. A total of 50% were Number Twos. That was because the fellows never had any chance to compare them. They never had anybody to tell them what they were. Last year out of a total of six hundred seventy thousand quarts, 3% were Number Twos. The difference in the price is not a great deal to be sure but 22c for No. 1 and 19c for No. 2. In the year 1915 it was 6c for No. 1 and 4c for No. 2. Of course the difference is not a great deal this year but that simply shows that it wouldn't have come about if they hadn't had some basis of comparison and someone to tell them how to bring up the crop from a poor crop to a big crop. So we have been able to change all that to a great deal better quality. Along that line, we are growing a different variety because we realize the variety we have been growing is gradually deteriorating and we are showing these men, who are very hard to show—only about 50% speak English—it is very difficult to show them a new thing. You have to demonstrate it to their eye before you get them to do anything with it, and we have to show them in black and white whether its better to grow them or not and they are gradually planting other varieties and I consider the success of this organization is due to the management. These men have been very fortunate in being able to get the services of a man who was brought up in the business and whose health failed him so that he was able to take hold of this proposition, and he has built up the business side of it so that they have no responsibility about the dollars and cents end of it other than to hand him his salary at the end of the season. Although they own every cent's worth of that business, the books are kept exactly as well as a bank or any other big business, but they have such implicit confidence in this man that they accept his word as Gospel every time. The bank realized the situation when it began and realized it ought to do something and they have been willing to accept the note of the Association for the crates, for the baskets, for the fertilizer, for anything they see fit to purchase. For money which the Association got would be paid through the bank and the cost of the baskets and the crates deducted from that. As a matter of fact this Association has never had to put up one-fourth the money beyond the interest on the money that purchased the material and I think every local bank ought to do the same thing.

I believe this idea of cooperative effort in a growing and selling proposition is just as possible with big fruits as with small fruits.

As to the membership in this association, we let them elect anyone that they wish to for membership. They sign, on becoming members, a condition which is very binding. In fact, it carries a clause with it which very few people would subscribe to, which requires them to sell their crop through the association; that they can't withdraw from the association during the selling season without the forfeiture of the dues, the money which they have already put in and if they do they lay themselves liable to be sued by the association for the damages resulting from their withdrawal. A man can resign by resigning before the first of May and then nobody says anything, but if he attempts to get out during the season, there are severe penalties attached to that. We therefore bind them together so that they ship through this organization and their whole product is sold practically as one man. We have done very little about labels because we are selling in a wholesale way. If we were selling to individuals we would probably put up an attractive label and sell our fruit that way, but we are selling by the carload. We are in such a place that we don't quite think we fit into a retail proposition. We have no markets in a wholesale way nearer than Boston and a person in the association can sell less than a car of strawberries locally if he wants to, but anything over that has to go to the Association.

They pay their manager a per cent of the business. If we do a business of one hundred thirty thousand dollars, as we did this year, he gets a certain per cent of that. That's a very simple way to pay a man and get a good man for the job, if he is willing to wait once a year to be paid, because that's the only time they have any money to pay.

I feel we have there a nucleus of an idea which can be spread all over the New England states. I would like to take the time to tell you about this, about the conditions under which we are working out there and the organization which I am working for, myself, at the present time, but I am not going to do that because I feel you have had enough of this. I feel it is the only hope of the future of New England. You know the West did not develop until we got big organizations working out there and making money for the farmers and shipping their goods under cooperative association. The early West was a story of burning their grain and wheat for years until the cooperative association came along and culled out the poor stuff and took the markets of

the East right out from under Eastern people's noses. Now! New England is in the same class. You can get along for a while, undoubtedly, but you are going to be up against the rocks in a few years because the rest of the country is organizing. That's the trouble that New England will be up against in the next few years.

PACKING HOUSES IN WESTERN NEW YORK

**MR. R. W. REESE, Manager of the Western New York
Cooperative Fruit Organization.**

I am glad to meet you in Rutland. Its the first time I have had the pleasure of attending one of your State Society meetings although I have met most all of you, I think, in some of the other New England states, at New England fruit shows or other meetings, and while your apple show this year is probably as small as you have had in a good many years, it certainly is up in quality and it does me good to get over here in New England and see the high quality stuff you are able to produce.

I don't know whether all the Northern Spies which you might grow on a tree would color up quite like those in the barrel or not, but if you get any high per cent of them that would come up like the Spies you have on exhibit, you certainly have a wonderful market apple.

To get back to the subject of packing houses in Western New York, I have no speech to make on the subject, but simply want to tell you in a very offhand manner a little something of our development there, and if there are any questions that come up, please feel free to ask them.

I might say just a word in regard to the general fruit district of Western New York. Yesterday Mr. Loomis outlined the district to some extent. It is a district which extends about 150 miles east and west from the Niagara River to the Western edge of Oswego county and takes in the four lake counties, Niagara, Orleans, Monroe and Wayne, with a considerable fruit development in the four counties. In this territory, apples, of course, are by far the leading commercial fruit, but the peach industry, pear industry and cherries are also very important. It is probably the largest quince producing area in the country and also a considerable volume of prunes and plums is grown. In the apple markets of Western New York, the general plan of sales for years past has been sales at point of origin, either through

local buyers or other representatives of houses from the outside who come and buy directly at the orchard, very often buying the entire crop of an orchard, sometimes packed by the grower, sometimes packed by the buyer. When packed by the grower, it is usually packed according to the buyer's specifications, or if packed by the buyer, of course packed according to his specifications. There are a number of growers who always make a practice of putting their fruit into cold storage and watching the market; selling at what seems to be the high point through the cold storage season. One of our largest growers in Western New York has always made the practice of selling early, never storing anything to amount to anything and claims that over a period of years he has beaten the market by selling at or about harvest time. Another very large grower always stores all of his fruit, usually holding until about May to sell and claims that he has always beaten the market by playing the long storage game, so its a little bit hard to tell when or how is the best way to sell because we have considerable divergence of opinion, but the general system of handling fruit has developed very much as it has in other sections, and the quality of pack put up throughout the district is nothing for the district to be particularly proud of. There have been a good many barrels of pretty badly beaten fruit and the pack has a black eye in the name of the trade. When you are talking about western New York fruit, they generally knock it a little bit, the same as they do when you are talking about any other district.

About 1918, as a result of a fruit survey through Niagara county—this survey had been made through the College of Agriculture over a period of five years, ending in 1918—and when the figures were brought together, we began to get some ideas on fruit growing. On 100 fruit farms, taking in one of the most concentrated townships it showed that the average income on those fruit farms was lower than on the general farms of the State. Fruit farm income was lower than the general farm average for the entire state. It put a number of the leading fruit men in the county to thinking over the proposition and in cooperation with the Farm Bureau, a county meeting was called of representative leading growers to talk over the situation and see if some plan could be devised for improving the conditions of fruit growing in the section and as a result of that, they decided that one of the things most needed was to get a better standardization of the fruit packed in the district, improve the pack standards and also increase the distribution of that fruit and not be entirely dependent

on sales at point of origin. The result of this was the organization of six cooperative packing organizations in 1918. Each association owned or leased a packing house of sufficient size to handle ten to twenty-five thousand barrels of apples and the first year one of these associations acted purely as a cooperative packing association. The fruit was brought in by the members, packed according to a certain specification and each member retained the ownership of the fruit and sold it as he saw fit. The other five associations pooled the fruit as it was brought in; two pools, one for fruit sold at packing time and not put into cold storage and the men received the average pool price for the variety, grade and size into which his fruit went and that went fairly satisfactorily. The association that tried individual selling that year hasn't sold it since because when you have ten or fifteen growers all concentrated at one point, all packed under the same brand, it made a pretty good chance for a buyer to play one man against the other, because it didn't make any difference what lot he bought. There were some better salesmen from those men than others and the man who did not come up to the average felt bad about it and since that time they have been pooling their sales.

In 1919 there were thirteen packing houses, increasing by seven. They went through the season that year, each association grading, packing and selling the fruit for its members. The season of 1919 was a successful one. Prices ruled pretty satisfactorily with a gradually increasing price throughout the season. Then came the big crop year of 1920. There were 17 associations and by this time they felt that a central organization was needed. The Western New York Fruit Growers Cooperative Packing Association was organized, a cooperative organization made up of the membership of these local organizations. The central organization did not act as a sales organization. Its purpose was to standardize pack and work for the general good of the local associations. The brand was owned by the central association and the central association laid down the rules under which the various local associations should pack. These were enforced by three inspectors who made the rounds of the packing houses to keep fruit up to standard. I might say this Central Organization is a cooperative organization, each one having one representative on the part of the association. From this number a board of five directors is elected, which has the active control of the detailed program for central association, and a general manager who carries out this detail program. The season

of 1920 is one which we would rather forget than remember because with the big crop and a rather adverse market conditions, very high production cost, the fellows who had the lightest crops were the ones who were best off because they lost less money. That was actually the condition in a good many instances. There wasn't any money made through the Western New York District in apples in 1920. They did gain a whole lot of experience in the season of 1920 there, with 17 local associations all packing under Cataract Brand, but independent sales. They had a wonderful sale organization system of competition but they were all putting out the same pack without adequate contact between those points. One of the best buyers in New York City, a man representing a very good store and a very good string of stores, excellent prospect, came up and bought ten acres of apples. He was well satisfied with the quality of the stuff and took that ten acres as a starter and intimated that he was going to be a good buyer through the season. He paid a good long price, f. o. b. price, and shipped them down to New York, while there were some of the other associations putting out the same brand, same quality goods, had a little trouble making sales and were consigning into this same market. By the time his fruit got down there he could go and buy fruit delivered for 25 or 50 cents a barrel, less than he had paid f. o. b. He had no protection. He didn't want any more of that business. He had to have protection if he was going to buy on an f. o. b. basis. He bought fruit after that but he bought it all delivered, and that happened in several different markets and they had a lot of trouble. It resulted this past season in somewhat of a reorganization of the central association and putting in a central sales department so that the sales from all the local associations are concentrated in the central organization, in that way getting a wider distribution and giving protection to the buyers. This year there are 28 local associations that are packing and marketing through the central organization.

I might describe in detail one of these associations. They are all organized along the same lines. Packing houses and equipments vary somewhat. The average local association is made up of ten to twenty-five growers and usually the average crop of an association will vary from twelve thousand to twenty-five thousand barrels. This year with a light crop, very few associations packed over seven or eight, and one above ten thousand barrels per association, but those same associations would pack, some of them, better than twenty-five thousand barrels on a fair crop

year. They are incorporated on a membership rather than a stock basis and due to the fact that most of the growers in the association are growing somewhere near the same acreage, and their financing has been per man rather than per acre or volume basis.

If it is necessary to raise six thousand dollars to put in a packing house and equipment, it is divided between five men, \$500. a piece. Instead of using stock they use certificates of membership in the association which are equivalent to stock because they are guaranteed 6% but don't carry voting power. In a number of instances it has been necessary to use credit in financing. In that case the local members have given a demand note to the local association for anywhere from one to five hundred dollars, whatever amount might be agreed upon. These notes are taken to the local bank and put up as collateral security on an association note. In addition to this financing, all associations are financed on a demand note basis for operating finances. Each member is required to give the local association his demand note for anywhere from \$250. to \$400. depending on the volume of business the association is doing. It is held in the treasury of the local association. At any time they need money these notes are used as security and there is always a contract between the member and his association that he agrees to deliver the following fruit for packing and sell through the local association. This note also acts there as a prod in case it is necessary to use it in violation of the contract, because the contract states that for failure to deliver to the local association the fruit contracted, the grower will pay the local association damage for the fruit which he fails to deliver, and this demand note of course can be foreclosed at any time in case he fails to live up to his contract. There is also a contract between each local organization and the central organization. Each local association gives the central organization its demand note for \$1000 and is contracted to deliver through the central association all fruit under contract by its members, and in case of violation of that contract, there is a demand note to enforce it and it has been found pretty important to have an organization tied up on a strict contract basis all the way through. It has not been necessary in any case to use that. It has been necessary in a few cases to call men's attention to the fact that they were under contract.

A local packing association owns or leases a packing house in which to operate. In most cases they own it. These are located, more than half of them, in conjunction

with cold storages, where they have been able to lease or buy land immediately adjacent to a cold storage and put up a packing house so that they can roll the fruit into cold storage or load it onto the cars. There are 40% of the associations that are not in association with cold storage and one association which is located four miles from the railroad because the particular fruit center is back there four miles from the railroad and it is easier to pack the fruit there than to haul to the shipping point to be packed. The average size for packing house is about five thousand square feet of floor space, usually about 50 to 100 feet. This will, at work, handle around 20 to 25 thousand barrels during a normal packing season of our New York State varieties beginning with Wealthy, running lightly with those early varieties, with Greenings, Baldwins, etc. The size of floor space you need depends on how long a season you have to handle a given volume, and how you are able to dispose of fruit as it is packed, and the number of growers. The more growers you have, the more space you must have, for as he brings his fruit to the packing house, it is necessary when the fruit is delivered, to keep the different lots separate, and if you have only ten lots to keep separate it is easier than 25.

When a man delivers 25 barrels of apples, a receipt is made out for 25 barrels of Baldwins, for example, in triplicate, the grower receives his copy, one copy fastened to the lot showing the number of packages and variety and the third stays in the book. When they start carrying that lot they know exactly how many barrels are to be accounted for in that lot. Before they did that, a man's number was stamped on the barrel, but it is easy to overlook where they are near together.

The equipment in the packing houses vary considerably and I am sorry to say that we don't have a single packing house which anywhere meets our desires in the line of equipment. A satisfactory sizer has not been found for apples. As far as we are concerned, we haven't found anything that is 100% or anywhere near it. We are using the Trescott sizer, the Pease sizer and have used the Gifford sizer and this year have been using the Rex sizer. The Gifford sizer was one which operated on a principle of belt and roller. We have discarded that entirely. It was satisfactory on fairly round varieties but if you get on Maiden Blush or a flat variety, you would have 2 3-4 inch apples and turned down flat going through an inch and a half space, so we discarded that. Our Trescott sizer is 95% satisfactory as far as sizing is concerned. It has a lot of

capacity and would be very satisfactory for handling gravel, but it does bruise fruit more than we like. We are still using a lot of Trescott machines and from the standpoint of accuracy and capacity we find it satisfactory, but for Wealthy, McIntosh and Spies it certainly is not satisfactory on account of bruising, and it is an equipment which takes a lot of putting up and a lot of work getting it in shape so that it is satisfactory but it is still a machine well worth considering out of the lot of machines we have to consider, but it is not what we want. We have several Pease machines. That is one which works on the opening cups and gives us fairly satisfactory sizing. It doesn't size as accurately as the Trescott. It probably can be operated with less bruising than a Trescott.

A great many times it is not so operated. There is one trouble on the present Pease machine. It has a roll conveyor sorting belt and where the apples are sorted for quality and a space between that and the lifts or cups where it fits in, and one trouble is to get your sorting at the right spot to make proper fit. If the stuff comes a little too fast, it balls up faster than you can fit it. That is one of the weaknesses of that machine. It may be overcome and while it is not satisfactory, it is another machine that is still in the running, and we are still using it. The Neway machine put out by the Rex Company is a new principle for the district. There are parallel rolls which are cupped out and the apples pass along over those. It was operated for the first time this year and showed up a good many of the weaknesses which you always find in the first operation of the machine. Some mechanical weaknesses, not having heavy enough shafting, and in the larger machines, improper kinds of wood were used and rolls warped and we did not get accurate sizing. On machines where they used the right kinds of wood, they got accurate sizing. I don't know whether this machine is going to stay. I think it is. I don't know how much it is going to crowd the other machines. It has some desirable features and some weaknesses. We are still open on that machine. We haven't really come to a decision in regard to it. I think these three machines I would suggest looking over very carefully but we can hardly recommend one above the other and we don't like any of them and we feel that there is a big field there for work on a good sizing machine. One of the hardest things we have to contend with is to get something with capacity, eight hundred barrels at least a day and without undue bruising of fruit.

For a peach and pear grader, we are using entirely the Burke sizer.

Then, of course, there is the matter of power presses and there isn't at the present time, so far as I know, a satisfactory commercial power press for heading barrels on the market. The Connover Brothers at Hilton, N. Y. have a couple of home made headers which work out very satisfactorily. They have a home made arrangement which will head four hundred barrels per press. They claim that last year they saved enough breakage on hoops—I know a year ago this year that it was about impossible to head a barrel without breaking at least one hoop. They claim they saved enough on hoops that year to pay for two presses, and headers are the hardest people to get in a packing house. If you have a header who will head three hundred barrels a day you are doing it a whole lot better than a man who will head 100 or under. We find them hard to get. Usually coopers are the best headers and they put them in fast and right. The man who fools around with the head always bruises apples and breaks hoops and on large plantations where a man has any volume of business to handle, or large associations, I believe there are going to be one or two hydraulic presses on the market. Mechanical shakers for shaking barrels down as they are being filled are important. We have some trouble in large capacity from failure to get the barrels properly racked down as they are filled. It is a tendency to forget about a barrel and try to tighten it afterward so that mechanical shakers are very important for barreling in large quantities.

In regard to our sales arrangements, after this fruit is brought to the packing house and the grower given a receipt for it, it goes over the sizing machine where it is sorted for quality and in our Cataract Brand we put up an A grade and a B grade pack and in some cases, "unclassified" is packed instead of the B grade, all the fruit being sized in quarter inch sizing and the other two and a quarter up without sizing. The fruit, as soon as it has been sized loses its individual tendency. He is credited on the bill with so many barrels of Cataract Brand in different sizes and so many pounds of cider and that's then put into the association pool and as soon as the fruit is packed the actual control of that fruit passes out of the hands of the local association into the hands of the central association which decides whether or not the fruit shall be sold at that time or stored, or what shall be done with it. It has been a pretty long step to get that far on marketing in six years. We have made a lot of mistakes undoubtedly, but the season

has gone pretty satisfactorily from a sales and purchase point of view.

I might tell you about some of our troubles because you may be sure we have had them and a lot of them. It isn't all smooth sledding by any means. One of the first troubles are too many varieties. This year we have actually 93 varieties of apples, with probably sixteen good commercial ones. I didn't think we had over thirty or forty until they began coming in this year. On a normal year, a heavy crop year, there wouldn't be that many because a lot of those odd trees wouldn't be picked, but this year members wanted to load everything in onto the local association. They are a nuisance in the packing house. A man brings two or three barrels of one variety to the packing house. You haven't enough to pack a B grade or one barrel of A grade. You can't size them. On the early stuff which we are packing in bushels almost entirely, you can handle the small lots to better advantage, but when it comes to a barrel proposition they are hard to handle. Maybe half of its members will have Maiden Blush, which isn't a large commercial variety but one of importance. There will be some grower who has a few barrels. To get all of those to the packing house at one time is another problem. You have them strung out over a period of ten days or two weeks. Somebody has to go to a picnic or funeral and can't get his apples picked and that makes trouble and it runs up packing cost and then when it comes to the matter of sales, we have had some trouble this year. The fact that the sales have been taken over by the central organization has caused a little constraint on the part of certain dealers and now the trade as a rule have taken very kindly to the proposition. The trade at the other end we get along with absolutely fine, but there have been some instances of local dealers who have been in the habit of buying fruit through the community who haven't felt very favorably inclined to having it handled through other channels. I know one dealer said he was going to pay prices that would make the association prices look foolish, and he did overpay, because on pears we had 75% of the pears under association but he wouldn't pay the association but he did take up the non-members stuff and paid about three quarters of a cent over what we were able to get as an association. Twenty miles from there he bought Bartlett pears for two cents a pound. What he lost on his own community he made up in another community. That was good business on his part, absolutely no hard feelings toward the man except that possibly he did do a little under-

handed work, and this thing we have had to contend with all through the season: A good many times there have been stories which have been started in regard to the associations and have grown somewhat, and in a good many cases when we trace them down we find absolutely no foundation for them, but its a thing which we have had to contend with and if you have members of the association who wonder as to whether it is a good idea to be in and a fellow that's a good word artist gets a hold of them, he can make red look blue.

I have told you something about the troubles we have been up against. We do feel, however, that there have been some benefits derived and I think the membership feels that one of them has been a better pack of fruit than was put out by the same men when they were packing independently. I am sure that the association pack is not as good as was the pack of the best members in that association. It is decidedly better than the average pack put up by membership and it takes time to develop your standards to where you want them, but progress has been made and we have had very satisfactory results.

We have gotten a very much wider distribution, New York City and Philadelphia and Pittsburgh and Cleveland are probably the heaviest shipping markets from Western New York, but the tendency is for everybody to ship into a half a dozen large city markets. We are concentrating primarily on smaller markets. This year we are shipping a great deal of fruit into the one car towns and they will pay a longer price as a rule than the large city market as an f. o. b. price and you never get a rejection providing you are putting up good fruit. In your heavy city markets, when you are going in on a declining market you are going to have a good many complaints, no matter what the quality of the product is. If it isn't worth as much in the market at the time it was delivered as it was at the time it was bought, you are going to have certain dealers who will kick. We have been very fortunate in urging through practically all sales, but it has taken a lot of work to make some of them pay. You never have that in the small towns. When a man buys something he buys it and that's the end of it, so we have been working the smaller towns, small cities, places that will take a car a week, say, and have been getting over a wide distribution and I believe it is a good type of trade which hasn't been open to the individual grower previously. The prices which we have been able to realize this year have been about as good and in some cases a little

better, on a few lines not quite so good, as individuals might have gotten on direct sales.

So far as cooperative work is concerned, it will not perform miracles by any manner of means. I think that there has been a great deal of loose talk in regard to the benefits of cooperation with an idea that it was something about all you had to do was to get a bunch of fellows together and organize a cooperative association and you will make a lot of money out of it, but there is nothing farther from the truth than that. A cooperative organization must be organized on just the same business principles as any other line of business and you must have a good management back of it all the way through, and in any agricultural community you are going to have members that have to learn new business principles. You have got to learn that when you buy something, you buy it and when you sell something, you sell it. A deal is a deal and that has been one of the hardest things for some members to remember and another thing, for the good of your association you must have every member in it tied up with an iron clad contract, not that you will want to use that but the moral suasion of holding your men together is well worth while, and another thing, don't organize a cooperative organization for anything unless you have the best men in your community in it. Your men who are the leaders in the community are the men who are going to be leaders in your organization and unless you have good leadership, it will go to the bow-wows, as 75% of the corporations that have been organized in the United States have done; but if you do have good local leadership who put good business principles into it and conduct it along sane, safe business lines with the idea of not making the last dollar in the world out of the proposition, but one of gradually developing a business from the standpoint of soundness, I think there is a pretty good future for cooperative work.

Fruit is one of the hardest lines to handle satisfactorily due to the highly perishable nature of the product, and to the fluctuating markets, and it takes pretty careful handling to put it across in good shape, but of our associations that have been organized in western New York—I think there are thirty-three organized at the present time—only one of that number has disappointed. There is one which got onto the rocks and went up. There are 28 of these in the central organization and the others are operating as independent ones. The membership throughout the organizations is a satisfied membership. It isn't 100% membership but for the most part it is satisfied and I be-

lieve it is coming stronger all the time and as the work develops, there will be greater benefits from the work than has been received up to the present time.

THE RISE OF COMMERCIAL APPLE ORCHARDS IN VERMONT

BY M. B. CUMMINGS, BURLINGTON.

There must have been many fruit trees in Vermont as early as 1810, for in Thompson's, "History of Vermont," it is stated that at that time, "there were immense quantities of apples produced. These were mostly manufactured into cider." It was customary for all to drink it freely as water, or more so, as the price abroad did not warrant the expense of transportation. Distillation was therefore resorted to, and large quantities of cider brandy were made. In 1810 there were 125 distilleries in the state, producing 173,285 gallons, but in 1840 there were only 2 distilleries, producing 3,500 gallons. It is thus seen that the reform in liquor traffic in Vermont began some years ago. The sterilization of sweet cider by boiling was unpractised in the early days, and there was a considerable period of intemperance between 1810 and 1840. After a time, however, the spell was broken, and soon "the farmers began to put their best apples to better use by feeding them to their cattle, their hogs, and horses." The early orchards were probably spontaneous in origin, coming from wild seedlings and not from grafted trees.

The first orchard of any size, as far as is known, set by man in Vermont, was put out in 1819 by Mr. Phelps, grandfather of the late Prof. W. N. Phelps of South Hero. The orchard embraced about 20 acres, and was of unimproved varieties, mostly ungrafted trees. Some of these original trees were bearing in 1882 when the area was reset to standard varieties of good quality.

In 1884, when W. N. Phelps was ten years of age, he went to live on his grandfather's farm on what is now known as "Broadacres." It contained one of the largest orchards in Grand Isle County, which covered 10 acres of land. This orchard yielded in one year 1,000 bushels of apples, most of which were of the cider apple sort, and 29 bushels of grafted apples, the latter being Rhode Island Greening, Spitzenburg, and Bellflowers. It is reported that the cider apples sold for 10 cents a bushel to French people

from Canada. In those early days a crop of 1000 bushels of apples was called a great yield.

In 1866, there was a twelve-acre apple orchard set in pastures just east of the Academy at Isle la Motte. This was the largest one on that island. The variety grown was Rhode Island Greening. Mr. H. H. Hill, a pioneer in fruit growing in northern Vermont, reports that in one year this orchard produced 100 barrels of apples, and that was called wonderful for that time. This farm is now owned by Daniel Trombley. In 1896, Grand Isle County produced 55,000 barrels of fine grafted apples, a quantity almost twice as great as that reported by apple buyers in 1919.

In 1870 the famous orchard of C. T. Holmes of Charlotte was set. This contained 105 acres mostly set to Rhode Island Greenings, although there are some Northern Spies, and Baldwins. A man once offered \$55,000 for this orchard property. Recently about twenty acres more were set of the same varieties, including also some McIntosh and North Western Greenings. The original trees of the 1870 orchard were set 25 x 25 feet apart, making 70 trees to the acre. When Mr. C. T. Holmes became sole owner in 1900, he cut down each alternate row, thus leaving the trees 25 x 50 feet apart, or 35 to the acre. There were very few apples produced in this large orchard between 1870 and 1900. At the latter date, however, Mr. Holmes began to cultivate and enrich the land and to prune and spray the trees. In 1902, this orchard yielded 5,200 barrels, netting Mr. Holmes \$12,000. In 1909, it yielded 3,707 barrels, bringing in all \$18,000, net, \$10,000.

In 1880, the celebrated Fameuse orchard at East Highgate was set. There were about 70 acres originally planted, but the orchard was reduced in 15 years to approximately a 50 acre area. This was put upon the slopes of a small mountain, the trees being placed 25 x 25 feet each way in rows nearly round the hill. As the trees came into bearing, they were found to be bogus varieties, which in 1885 were cut down and reset or grafted. It is stated that Mr. Rixford recovered a paltry damage of \$1,500 for the fraudulent substitution. In 1906 this orchard came to public attention, for in that year it produced 10,000 bushels of Fameuse, or Snow apples. Mr. Rixford sold 9,000 bushels, and let 1,000 bushels go to waste, probably because he had no facilities for disposing of the rest of the crop. The fruit was imperfect, not having been sprayed, it netted him only \$1,500. It is a singular thing that as early as 1885 one man should have exercised the foresight and good judgment

to have planted the delicious Fameuse apple when there were hundreds of other sorts of less merit. It was a wise choice. It is doubtful if any other variety would succeed as well as this one; and exceptionally fine fruit has been grown there for a series of years. Since 1915 this orchard—now owned by Edward Seymour of New York City—has been given a good deal of attention, and it has been regularly and thoroughly sprayed, and most of it has been rather regularly pruned. Some years the crops there have been valued at \$6,000 on the trees. The annual cost of maintenance probably varies between \$1,000 and \$2,000, depending somewhat upon the cost of packages, and the expense of picking and marketing. Better Fameuse were never seen, than grew in that orchard in 1919, and other years as well.

The orchards of Luther Putnam, of Cambridge, are astride the border line of Chittenden and Lamoille Counties. The plantings in this orchard began in 1870, and continued till 1900. There are about 40 acres in this orchard which contain Wealthy, Fameuse, McIntosh, Tolman, Wolf River, and many more. Mr. Putnam was a pioneer in testing many varieties, and has done much to advance apple culture in this state.

One of the early hill town orchards is that now owned by Julian Dimock, of East Corinth. The plantings of this rather extensive orchard were begun in 1870. The setting of new trees and the grafting over of old ones continued at rather irregular intervals till 1899. The orchard now embraces 35 acres, and has 1,600 trees. The varieties in the order of importance are McIntosh, 800; Fameuse, 250; Bethel, 150; Northern Spy, 100; and in smaller numbers, Lincoln, Tracey, Alexander, Yellow Transparent, St. Lawrence, Winter Banana, and Delicious. The more recent plantings here have been of McIntosh, Spy, Delicious, and Winter Banana. The Dimock orchard is one of the best known orchards outside of the State, probably on account of the rather unique and high grade advertising employed by the owner. Here are some of his expressions; "Dimock Apples; You can eat them in the dark", "We think that the apples grown in this orchard have a little the best flavor of any on earth;" "Fancy Vermont Apples."

The town of Dorset has some large orchards. Although all under one management, they are owned by E. H. West, J. B. Milliken, and F. C. Overton, all supervised by E. H. West. These include about 170 acres, which were mostly set out between 1911 and 1916, although more planting was done in 1918 and 1919. These orchards comprised

8,540 McIntosh, 1,868 Wealthy, 1,310 Spy, 2,467 Northwestern Greenings, 415 Delicious, 200 Wolf River, 210 Fameuse, 350 Rhode Island Greenings, 160 Ben Davis, 150 Red Astrachans, 68 Baldwin, 36 Yellow Transparent, 50 Wageners, and some other varieties in small quantities, totaling 15,908 trees. Some car consignments of McIntosh of the 1920 crop sold for \$11.00 per barrel. Mr. West is a skillful orchardist.

The Belmont Orchards, owned by C. L. Witherell, of Cornwall, near Middlebury, were begun in 1910 and were continued in 1912, 1914, 1915, 1916, and 1917. The varieties are: McIntosh, Delicious, Winter Banana, Wealthy, Northern Spy. These orchards are mostly on gravel or clay loam, with slightly rolling surface areas. The trees are headed low, with strong scaffold systems. This orchard is one that promises well. A lot of blue ribbon fruit has been grown here.

The Grand Isle Orchard Company at Grand Isle, has a setting of 10,000 trees. The first plantings were made in 1912. The varieties are chiefly McIntosh, although there are some Delicious, Wealthy, Winter Banana, with a few Ben Davis. Most of the trees were set 42 feet apart, with fillers of plums, or cherries. Most of the land slopes gently to the west and toward the lake. The orchard extends to the shore, is near a wharf, and is less than a mile to a Rutland Railroad depot.

The Edward Loomis orchard in West Addison comprises about 100 acres of trees which were set in 1910. There are about 7,500 trees composed of King, Hubbardston, McIntosh, Alexander, Wealthy, Northern Spy, Tolman Sweet, Spitzenberg, and Winter Banana. The soil is a clay loam, and the exposure is to the south. The exposure is slightly rolling, with a slight decline to the lake. This plantation is developing into a model orchard of the Champlain Valley type.

The Connecticut Valley Orchard at Westminster, owned by Mr. J. W. Dascomb, and managed by Mr. J. W. Collins is one of the interesting hill town orchards in southeastern Vermont. This orchard is on high ground, embraces 75 acres, and comprises 8,000 or more trees. The setting was begun in 1912, and completed in 1919. The varieties are Wealthy, Winter Banana, Northern Spy, Rhode Island Greening; but there are more McIntosh than of any other variety.

The Justamere Farm, once a mere farm, but now "Just Apples," owned by B. C. Buxton, of Middletown Springs, now embraces about 14,000 trees. The varieties

are Northern Spy, Rhode Island Greening, Wealthy, and McIntosh. The orchards lie on inclined areas, some on steep hillsides, and are doing well.

The MacRae Orchard at Castleton, owned and managed by R. R. MacRae, embraces 200 acres, and has approximately 13,000 trees. The varieties are McIntosh, Northwestern Greening, Wealthy, and Fameuse, and a few others. This is a well managed orchard, and an inspiring sight to anyone who likes to see things done well and on an extensive scale.

Largest, and last of all considered in this somewhat extensive list are "The Orchards", owned by Edward H. Everett, of Bennington, Vermont, and operated by H. A. Albyn, J. C. Ryan, and James McKee. This orchard is located on the eastern slope of Mount Anthony, on the place once known as the John Griswold Farm and on Carpenter Hill in Pownal. The plantings in this orchard were begun in 1911, and are still in progress. This orchard now embraces approximately 65,000 trees. The varieties are McIntosh, Wagener, Grimes, Stark, Northwestern Greening, etc. This is in all respects, the largest orchard plantation in Vermont, and perhaps in all New England. The whole plan is commercial; the orchard must pay, and it will. Some of the rows of trees are almost a mile long. It is expected that plantings will be made every year until this orchard contains 100,000 trees! What a sight! A mountain of apple trees; beautiful to see; profitable to own.

The preceding paragraphs tell of only a few of the large orchards, namely, those best known to the writer. There are many more sizable orchards in the State, and new ones are being set or old ones interplanted or extended as the years come and go.

In the tabulated list of recent orchard plantings which is very incomplete, because the survey is unfinished, one may get some idea of the extensive nature of the newer plantations of our State. No attempt has been made to list all the orchards of small trees in even a single town; for such a list would be interminable. On the other hand it has seemed more worth while to select at random so as the better to show the general distribution of the modern orchards.

TREES AND ACRES OF OVER 10 ACRES, PLANTED SINCE 1912.
MATURE ORCHARDS NOT INCLUDED

Name	Town	No. of Trees	Acres
The Orchards	Bennington	65,000	650
MacRae Orchard	Castleton	13,000	200
Buxton Orchards	Middletown Springs	18,000	180
Dorset Orchards	Dorset	15,000	170
E. L. Hildreth	Brattleboro	1,250	25
F. H. McFarland	Waterville	1,600	20
Scott Farm	Brattleboro	3,500	35
W. J. Anderson	Shoreham	1,860	24
Julian Dimock	East Corinth	1,600	35
C. L. Withereell	Middlebury	4,500	45
E. N. Loomis	Vergennes	8,000	100
Grand Isle Orchard Co.,	Grand Isle	10,000	215
Conn. Valley Orchard Co.	Westminster	10,000	75
A. J. Eaton	South Royalton	3,000	25
Wm. Darrow	Putney	3,000	32
C. T. Holmes	Charlotte	2,000	20
G. E. Badlam	North Ferrisburg	1,000	25
A. H. Hill	Isle la Motte	3,500	40
Elmer Hill	South Hero	4,000	40
Dana Safford	Brattleboro	1,200	44
W. F. Ranney	Putney	1,000	40
Dr. C. C. Rice	Rutland	2,000	80
Dr. Osgood	Saxtons River	2,000	80
Wm. Noonan	Addison	1,500	60
Leo Heminway	Bridport	3,000	120
J. E. Sperry	Cornwall	1,000	40
Paul Dow	Middlebury	1,000	40
Winslow Clark	Shoreham	4,000	100
J. M. Stevens	Orwell	2,000	80
Hoyt Orchard	Castleton	1,500	60
Elmer Wright	Weybridge	1,000	40
L. L. Marsh	Enosburg Falls	1,000	10
Quechee Fells Farm	Quechee,	250	10
Shelburne	Shelburne	1,000	55
O. M. Amidon	Grove	1,000	24
E. H. Mason	Randolph	640	16
Chas. Merrill	South Burlington	1,000	10
M. C. Hill	Charlotte	500	15
A. W. Coolidge	Bellows Falls	500	10
Geo. D. Sherwin	Burlington	1,200	20

SOME REMARKABLE CROPS.

It is not the purpose of this article to set forth the yields in the different orchards, or of the different varieties; but one or two rather spectacular cases might be cited in this connection just to show the possibilities.

A single peach apple tree in 1912 in the town of Winooski produced 45 bushels of apples one year, which sold for \$19.61. This was when apples were cheap. The tree was near the barn, occupied no valuable land, and caused no inconvenience to the owner. In this particular instance, the tree was not fertilized, nor sprayed, nor pruned, and therefore with no expense, the crop was clear gain. The owner said that if he had a few dozen trees like that one, or could have marketed the crops as successfully as he did the crop of this single tree, he would have realized as much from those few dozen trees as he had from his whole farm for the time and money invested. It must be remembered in this connection, of course, that the peach apple bears early, and the fruit is not large, and therefore did not bring nearly as large returns as would a larger winter apple of more superior quality.

In Grand Isle County, in 1912, one tree of Cooper Market produced 14 barrels of apples, which sold for \$42.00. When one recalls that Cooper Market is scarcely worth eating at any season of the year, the wonder grows how the crop was worth \$42.00 to anybody!

In South Royalton in the White River Valley Orchard of A. J. Eaton, there was a tree 73 years old which bore a few years ago a crop of 40 bushels that sold for \$100! Was not this a mortgage lifter?

A Wealthy tree in Rutland County in 1919 produced 9 1-2 barrels of apples, exclusive of windfalls, which sold for \$8.00 per barrel, giving a return of \$76.00.

A Vermonter recently reported that one of his carloads of McIntosh Reds sold in New York for \$9.00 per barrel, the other for \$11.00. Why should people in Vermont grow ordinary or mediocre varieties when Wealthies will sell for \$10.00, McIntosh for \$11.00, and Northern Spies for \$12.00, while Culverts sell for \$5.00, and Peach and Cooper for \$3.00?

VARIETIES OF APPLES.

Many varieties have been planted in Vermont; in general, altogether too many. But in the early days, the experimental trials for varieties had to go forward to

ascertain a suitable foundation for the great orchards of the present date. Through good fortune, some chose wisely, and through hard luck, others chose unwisely. How a man could foresee fifty years ago that the Fameuse apple was the best to plant in Northern Vermont is almost a miracle. Furthermore, thirty-five and forty years ago one might have wondered whether Rhode Island Greening, Northern Spy, and Baldwin would be suitable for the Champlain Valley. However, out of all the varied experiences of our state fruit growers some valuable information has come. The family orchard of many varieties is a thing of the past.

At one time Grand Isle County, the smallest County in the State had 121 varieties; 116 too many. The present trend in Vermont orcharding is toward a very limited number of varieties for commercial purposes. Some experts insist that we should have only a "big four," others, a "big six," and still others, a "big eight." The big four would be McIntosh, Fameuse, Northern Spy, and Wealthy. The big six would include two more; Rhode Island or Northwestern Greening, and Delicious; the big eight would probably include Wagener, and Winter Banana in addition to the others. In the near future orchardists may be planting Senator, Golden Delicious, Opalescent, or Grimes Golden, or Perfection, or something better than any of these.

VALUE OF TREES AND ORCHARDS.

With such large plantings as have been previously noted, it requires but little imagination to get an idea of the value of an orchard. The demand for the appraisal of an apple tree was first met when the Rutland Railroad was extended from Burlington to Montreal, and passed through some mature orchard in Grand Isle County. What is the value of an apple tree? There are two ways of arriving at an answer: First, by an arbitrary judgment of its probable value. Such a thing was done by the Vermont State Horticultural Society in its annual session at Rutland some years ago. The price agreed upon was \$1.00 per tree for each year since setting, and until bearing age, provided the tree was in good condition. The reason for the decision at that time was to establish a value or basis of determining damages due to deer. This price was accepted by the Game Commissioner at the time of announcement. The other method of fixing values is to consider the net income as interest and compute the principal from the interest at 6%. A crop in a 50 acre orchard sold on the trees for

\$6,000, but the average for series of years should be taken as a basis of estimating values.

The value of orchards can be estimated in part by considering the prices fixed by the owner. Mr. Holmes, at Charlotte once refused \$55,000 for his 100 acre orchard; The Grand Isle Orchard Co., estimates its property embracing 10,000 trees at \$100,000. R. R. MacRae at Castleton would not accept \$200,000 for his orchard of 13,000 trees. Although nine years ago the land for the orchard was purchased for \$75. an acre, and there are 200 acres set to trees.

SIZE OF THE INDUSTRY

THEN AND NOW

The U. S. Census of 1919 credited Vermont with 712,594 trees of bearing age, and 254,029 trees too small to bear. In 1909 there were 1,183,529 mature and bearing trees, and 219,833 too small to bear. The yields in bushels for 1919 were 960,252, as compared to 1,459,689 for 1909. In value all the fruits in Vermont; not exclusively apples, was \$910,881 for 1909, and \$1,957,515 for 1920. Since the factors of war and peace prices, and those of other fruits enter into the value as given, the conclusions as to increase or decrease are inconclusive: but the increase in total value of all fruits for 10 years was 115 per cent.

The Bureau of Crop Estimates computed the 1920 crop of apples in Vermont as amounting to 1,908,000 bushels, which was called 60 per cent of a normal crop: In 1919 it was 1,844,000 bushels, or 58 per cent; in 1918, as 1,200,000, or 30 per cent; in 1917, as 1,286,000 bushels, or 35 per cent; in 1916 as 3,319,000 bushels, or 90 per cent of a crop. Since the total crop for 1920 was 1,908,000 bushels, but with the commercial crop for the same year as only 570,000 bushels, there must be consumed or wasted, this year, the difference between the two sets of figures, or 1,338,000 bushels 446,000 barrels of apples. Do Vermonters eat apples? It would seem so.

The future of apple culture in our state cannot be forecasted with accuracy. But it is certain to be developed along commercial lines. The great number of large orchards composed of excellent varieties, and grown under good methods, will soon give the industry large dimensions, and induce a great output of fruit of very fine quality. Very well! Why should it not be so?

If one were to draw a few conclusions from past ex-

periences and from the present outlook, he would accept at least four maxims of good practice.

- I. Select high, rather than low land for orchards.
- II. Restrict the plantings to either four or six varieties that are adapted to Vermont soils, and climates.
- III. Adopt a good system of culture, and follow it.
- IV. Study the whole science, art, and business of growing extra fine fruit, for such is the only kind that pays *well*.

The author is indebted to the State College of Agriculture for the use of certain photographs; to the Vermont Experiment Station for some data on orcharding; to the Vermont State Horticultural Society for the use of certain cuts; and to numerous fruit growers in various parts of the State for furnishing records and information about their orchards.

REMARKS BY MR. KELLEY OF KELLEY BROS. NURSERY CO., DANVILLE, N. Y.

I am glad to be able to attend this meeting and to meet some of our customers and also some members that will be future customers. I was particularly interested in Mr. Perry's remarks as to the relationship that should exist between the nursery and the fruit grower.

We have always recognized the fact that our interests are mutual and it has been our endeavor to deliver good stock, truly named and at a low price.

From what I learn through talks with customers here (and some of your members have planted our trees by the thousand,) our trees have all been satisfactory.

It appears to me that here in Vermont you can grow wonderful apples, highly colored and of the best quality. In New England there is a great future for the apple grower. Nothing in the West or South can compare with the McIntosh and Spies I see here to-day.

I have been in the nursery business since 10 years old and I have become quite an expert in determining varieties and in nearly every instance our trees have proved true to name. This has been a source of great satisfaction to our firm and to the ones who deal with us.

BUSINESS SESSION.

Chairman E. H. West of the Nomination Committee recommended the election of officers as appears on the title page of this report, with the exception that Mr. H. L. Hindley was first elected Secretary and has since resigned. By unanimous consent the Secretary cast a ballot for them:

Mr. George W. Perry moved that in the absence of Secretary Cummings, E. W. Jenkins be appointed Secretary protem and that his expenses be paid by the society and that the Executive Committee be empowered to recompense him as they see fit. The motion was passed.

The motion was made and passed that a message of cheer be sent Secretary Cummings and E. H. West was delegated to wire the greetings.

The Treasurer's report was read and accepted.

President elect Mackae called on the members for their co-operation and asked for suggestions for the good of the society with the following response:

MR. GEORGE W. PERRY:—Members should look forward and not backward. Mentioned progress made since society was started.

MR. E. H. WEST:—Suggested advertising meeting more extensively and presenting every one who comes with an apple. The interest of the small grower should be stimulated.

MR. PERRY:—Approved of idea of handing out apples.

MR. WHEELER:—Appoint some one in each town to look after members and see about exhibits,—might make it a town affair.

MR. HACKETT:—Seconded Mr. West's suggestions—would like to interest people in quality of apples—shows should attract general public and broaden market for apples.

MR. BUXTON:—Suggested that apples be in another room separate from meeting room.

MR. COLTON:—Motioned that the amount of the salary of Secretary be left in the hands of the executive committee. Motion was passed.

PRESIDENT WITHERELL:—Brought up matter of New England Fruit Show.

MR. WHEELER:—The New England Fruit show was financed locally by the people in Boston at first. When they were unable to pay premiums each state offered to pay its own.

MR. COLTON:—When the New England fruit show was held in Vermont all premiums were paid by the Vermont

Horticultural Society—he also added that money spent outside of the state could not be taken from state funds.

MR. MCRAE:—Moved that the executive board have control of affairs connected with New England Fruit Show with authority to spend what they see fit. The motion was passed.

MR. PERRY:—Inquired if Vermont Fruit Show could not be held in Boston.

MR. COLTON:—The state auditor would not pass up money spent at New England Fruit Show. The show would cost about \$500.00.

MR. KELLEY:—Suggested voluntary subscriptions to pay expense at New England Fruit Show.

On motion seconded and carried the meeting then adjourned.

REPORT OF TREASURER.

W. C. COLTON, MONTPELIER.

Expenditures.

				Vou- cher No.
1920				
Nov.	29	Murray Printing Co.	Rutland	\$4.75 922
	29	The Tuttle Co.	Rutland	2.60 923
	29	A. S. Reed Electric Co.	Rutland	1.20 924
	29	Alida Fairbanks	Burlington	10.36 925
	29	F. C. Sears (Prof).	Amherst, Mass.	40.09 926
	29	Prof. M. B. Cummings	Burlington	16.39 927
	29	The Orchards	Bennington	5.50 928
	29	A. T. Clark	Vergennes	6.50 929
	29	C. L. Witherell	Middlebury	105.50 930
	29	R. R. McRea	Castleton	96.50 931
	29	W. J. Anderson	Shoreham	7.00 932
	29	Scott Farm	Brattleboro	36.00 933
	29	E. H. West	Dorset	79.50 934
	29	Dr. C. A. Gale	Rutland	.50 935
	29	D. E. Robinson	Pawlet	10.00 936
	29	Mrs M. E. Greene	Middletown Sprs.	10.00 937
	29	Mrs. A. O. Ferguson	Burlington	5.00 938
	29	R. S. Barton	Rutland	3.00 939
	29	A. O. Ferguson	Burlington	1.00 940
	29	Grand Isle Fruit Co.	Burlington	5.50 941
	29	H. A. Sawyer Co.	Rutland	1.61 942
	29	Prof. F. K. Shaw	Amherst, Mass.	33.89 943
Dec.	6	W. C. Colton	Montpelier	2.00 944
	31	Hotel Berwick	Rutland	90.20 945
	13	Smith Lumber Co.	Rutland	83.13 946
	6	George B. Houston	Rutland	13.50 947
	6	Metgger Brothers	Rutland	15.00 948
	6	Dennison Mfg. Co.	Framingham, Mass.	11.58 949
	6	Dr. Donald Reddick	Ithaca, N. Y.	51.96 950
	6	Mrs. A. O. Ferguson	Burlington	3.00 951
	7	A. T. Clark	Vergennes	8.00 952
	7	R. M. Freer	Burlington	4.25 953
	31	E. H. West	Dorset	2.44 954
	7	C. L. Witherell	Middlebury	24.18 955
	13	Rotary Printing Co.	Norwalk, Ohio.	2.43 956
	13	Geo. D. Aitken	Putney	5.92 957
	13	Miss Alice Holway	Putney	5.92 958
	15	R. R. McRae	Castleton	3.50 959
	31	Susan A. Nott	Burlington	44.59 960
	31	M. B. Cummings	Burlington	10.00 961
	17	C. C. Witherell	Middlebury	15.00 962
	17	W. M. Pease	Rochester, N. Y.	25.08 963
	31	Mrs. E. C. Jacobs	Burlington	4.82 964
	31	R. S. Barton	Rutland	2.00 965
	31	R. M. Freer	Burlington	2.50 966
	31	C. L. Witherell	Middlebury	132.76 967
1921				
Jan.	26	W. C. Colton	Montpelier	2.25 968

 \$1048.40

Expenditures Brought Forward.

1921			Brought Forward \$1048.40	
Mar.	4	Dean W. Edson	Montpelier	7.70 969
	4	Whitehead Hoagleo	Newark, N. J.	8.51 970
	4	R. M. Freer	Burlington	2.00 971
	4	M. B. Cummings	Burlington	22.48 972
	4	S. A. Rand	Burlington	2.50 973
	4	C. F. Brehmer	Rutland	4.22 974
	4	C. L. Witherell	Middlebury	27.89 975
Apr.	12	McAuliff Paper Co.	Burlington	3.00 976
Aug.	9	M. B. Cummings	Burlington	100.00 977
	9	R. M. Freer	Burlington	1.00 978
Oct.	4	M. B. Cummings	Burlington	13.37 979
	4	Susan A. Nott	Burlington	8.89 980
Nov.	5	Dean W. Edson	Montpelier	5.96 981
	5	Whitehead Hoagleo	Newark, N. J.	28.80 982
	5	Free Press Asso.	Burlington	37.77 983
	5	C. L. Witherell	Middlebury	50.00 984
	5	The Orchards	Bennington	23.30 985
	9	A. B. Soule	Burlington	6.50 986
	9	C. L. Witherell	Middlebury	6.78 987
	12	Cash on hand		147.66
				\$1766.43

RECEIPTS.

1920.			
Nov.	8	Cash on hand.....	\$ 431.16
	9	Friend Mfg. Co. special fruit, Gasport, N. Y.....	10.00
	9	Cash from secretary, dues.....	21.00
	17	Cash from secretary, dues.....	2.00
	23	Cash from secretary, dues.....	18.00
	23	Sale of space in exhibition hall.....	35.00
	26	W. C. Colton, dues.....	1.00
Dec.	2	Cash from secretary.....	3.00
	2	Sale of space in exhibition hall.....	30.00
	6	Special Fund.....	298.50
	9	Special Fund, additional.....	225.00
1921.			
Jan.	13	C. B. Stafford, dues.....	1.00
	1	Interest on deposits.....	3.65
Feb.	11	Cash from secretary.....	3.00
	25	State Appropriation.....	500.00
	25	Cash from secretary.....	6.00
	25	Special Fund, additional.....	50.00
Mar.	11	Cash from secretary, dues.....	13.00
	20	Cash from secretary, dues.....	6.00
July	1	Interest on deposit.....	6.67
Aug.	27	Special Fund, additional.....	50.00
Oct.	14	Cash from secretary, dues.....	7.00

14	Special Fund, additional.....	10.00
26	Cash from secretary, dues.....	5.00
27	Special Fund, additional.....	10.00
27	Cash from secretary, dues.....	20.00
		<hr/>
		\$1,766.43

SUMMARY.

Receipts

Cash on hand.....	\$ 431.61
Dues	106.00
Contributions to special fund.....	653.50
State Appropriation.....	500.00
Sale of space in exhibition hall.....	65.00
Interest	10.32
	<hr/>
	\$1,766.43

Expenditures.

Equipment & Expense of 1920 show....	189.96
Premiums	388.00
Lecturers Expenses and Fees.....	180.48
Hotel Bills of Lecturers & Officers....	90.20
Salary & Expense acct. of Secretary....	206.54
Reporting annual meeting.....	44.59
Total Expense of exhibit at N. E. Fruit show	167.43
Premiums for exhibits at N. E. Fruit show	283.00
Miscellaneous	68.57
Cash on hand.....	147.66
	<hr/>
	\$1,766.43

Nov. 18, 1921. I have this day examined the foregoing report and find it to be correct.

A. T. CLARK,
Auditor.

CONTRIBUTIONS TO SPECIAL FUND FOR 1920 SHOW.

A. T. Clark, Vergennes.....	\$ 5.00	
W. C. Colton, Montpelier.....	5.00	
W. F. Ranney.....	10.00	
C. E. Rice.....	3.00	
Wm. Noonan.....	5.00	
Chas. Holmes.....	10.00	
E. N. Loomis.....	10.00	
D. H. McHugh.....	5.00	
Wm. Anderson.....	5.00	
D. W. Collins.....	5.00	
Conn. Valley Orchard Co.....	50.00	
E. H. West.....	35.00	
A. O. Ferguson.....	10.00	
Mrs. Openheim.....	5.00	
B. C. Buxton.....	100.00	
Grand Isle Fruit Co.....	5.50	
Edward H. Everett Co.....	50.00	
Miscellaneous.....	30.00	
	<hr/>	\$ 348.50
Rutland Chamber of Commerce.....		225.00
		<hr/>
		573.50
Friend Mfg. Co.....		10.00
J. B. Wilbur.....		50.00
C. S. Page.....		10.00
Frost Insecticide Co.....		10.00
		<hr/>
		\$ 653.50

AWARDS IN 1921.**PREMIUMS AWARDED TO W. F. RANNEY, WESTMINSTER, VT.**

PLATES	1st	2nd
Baldwin.....	\$	.50
Bellflower.....		.50
Delicious.....	\$ 1.00	
Fameuse.....	1.00	
Hubbardston.....	1.00	
King.....	1.00	
McIntosh.....		.50
No. Spy.....		.50

PLATES	1st	2nd
N. W. Greening	1.00	
Pound Sweet.....	1.00	
Roxbury Russet	1.00	
Spitzenburg .....		.50
Sutton	1.00	
Tolman	1.00	
Twenty-ounce .....		.50
Wagener	1.00	
Wealthy .....		.50
Wolf River	1.00	
Single Box		
McIntosh		3.00
No. Spy		3.00
Fameuse	5.00	
Delicious	5.00	
Baldwin		3.00
King		3.00
5 Box Exhibit		10.00
	\$ 21.00	\$ 25.50
Total		\$ 46.50

PREMIUMS TO SCOTT FARM, BRATTLEBORO, VT.

Baldwin	\$ 1.00	
Bellflower	1.00	
Fameuse		\$.50
McIntosh	1.00	
N. Spy	1.00	
R. I. Greening	1.00	
Wealthy	1.00	
5—Box Exhibit		
5 McIntosh	15.00	
Single Box Exhibit		
McIntosh	5.00	
N. Spy	5.00	
Fameuse		3.00
Baldwin	5.00	
Wealthy	5.00	
50 apple exhibit	10.00	
General Display	25.00	
	\$ 76.00	\$ 3.50
Total		\$ 79.50

W. A. Jennings, 50 apple exhibit 2nd prize.....	\$ 5.00
Elmer Hill, South Hero, Vt., 50 apple exhibit 3rd prize	3.00
E. N. Loomis, Plate exhibit—Tolman 2nd prize..	.50
Dr. Gale, Rutland, Vt., Hubbardston, 2nd prize...	.50
Ralph Barton, Canned vegetable, 1st prize.....	\$ 3.00
Apple products, 1st prize	13.00
	<hr/>
	\$ 16.00
Scott Farm	\$ 79.50
W. F. Ranney	46.50
W. A. Jennings.....	5.00
Elmer Hill	3.00
E. N. Loomis50
Dr. Gale50
Ralph Barton	16.00
	<hr/>
	\$ 151.00

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Minkler, C. E.....So. Hero	Stalker, W. A.....Shoreham
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EIGHTEENTH
ANNUAL REPORT
OF THE
VERMONT STATE
Horticultural Society

PROCEEDINGS
OF THE
TWENTY-FOURTH
Annual Meeting and Exhibition
Held at Rutland, Vt.
November 17-20, 1920.



St. Albans, Vt.
St. Albans Messenger Co. Print
1921

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ADDRESS OF WELCOME.

HON. JAMES C. DUNN, MAYOR OF RUTLAND.

Mr. President, Members of the Vermont State Horticultural Society, and Friends:—

I am glad to welcome the Vermont State Horticultural Society to our city. These exhibitors are trying to educate the people of Vermont as to the value of apple raising. Their exhibit shows the different varieties that can be grown in Vermont, and the prices that they command in the market. All realize that this cannot be done without a whole lot of work and care, and the State of Vermont certainly owes a whole lot to these people for what they have done and are doing. We know that the orchards in Vermont have been sadly neglected for a number of years. In our travels we have seen orchard after orchard that has been eaten by worms or cut down for fuel. It has taken a long time to educate people to the value of these orchards. Some growers have waited too long and the opportunity has gone by for raising fine fruit from some of those orchards, but I do feel that this Society is a great benefit to Vermont. We all know the Vermont apple; that its quality and flavor cannot be beaten in any part of the country.

Speaking about the time that it has taken to educate these people makes me think of a story I read the other day of a country lad who came to the city and attended the theater, and when he presented his ticket the attendant said, "This ticket is no good in this theater, it is dated 1910." The lad said, "Why not, I purchased it here ten years ago, and this program says ten years elapse between act one and act two, and I have come back to see the second act, but I have forgotten about the first act." And these farmers are looking for the second act, and have forgotten about the first one. You have a fine exhibit here at this time and we all appreciate it.

RESPONSE TO ADDRESS OF WELCOME.

PRESIDENT C. L. WITHERELL, CORNWALL.

Members and Friends of the Vermont State Horticultural Society:—

As President of this organization I am on the program for an address. I will refrain from saying but a few words, for I know that you are anxious to hear the next speaker, and keen to have a look at this good fruit.

This society was founded in 1896 at the Agricultural College. We have held meetings at different places I think every year since then, and the organization has been growing steadily. Last year we had a very instructive meeting in this same building, and there was more enthusiasm than we ever had in previous meetings. Your Board of Trade asked us to come again this year, and I am sure we are very glad we did. This is, without doubt, the largest exhibit that the Society ever put up, for we have something like 275 bushel boxes of fruit here, or its equivalent.

There is one feature of the show that is of special interest. We have very few "flats", that is, shallow boxes. Nearly all of our displays are full box exhibits. The New England Show that closed last week had an exhibit twice the size of this in floor space, but nearly all of the packages were in shallow boxes, which, of course, spread it out through the hall.

We have a booth in the rear of this room where apples are on sale, and we hope that every one will buy an apple; if the first one tastes good, buy another. We hope that you will create an appetite for this box fruit which will be on sale after the show, and which you can obtain from the merchants here in your city. It has been a great pleasure to have them come in and buy this fruit of us. As a rule we have rather of a poor market after the shows, but Rutland is doing better than most of the towns in that respect.

DUSTING, A SUBSTITUTE FOR SPRAYING.

BY DONALD REDDICK, PROFESSOR OF PLANT PATHOLOGY,
CORNELL UNIVERSITY, ITHACA, N. Y.

Dusting plants to protect them from diseases is not a new thing. The method was first used extensively in France in 1850 and subsequent years for the control of the powdery mildew disease of grapes. Sulphuring of vineyards is still a regular practice in Europe and about 100,000 tons of sulphur are used annually for this purpose. It is to be noted that the use of sulphur as a fungicide antedates the use of Bordeaux spray by over thirty years. But the discovery of the value of Bordeaux mixture for the control of downy mildew and black rot of grape led to a wide extension of the use of this mixture for many diseases. Bordeaux mixture has been dried, pulverized and applied in the form of dust both abroad and at home. The "dust Bordeaux" was used most extensively in this country between the years 1895 and 1905. Numerous experiments, mostly in apple orchards, were performed in several states in which a dust mixture containing "dust Bordeaux", lime and Paris Green were used. The outcome of these experiments was that the dust method was wholly discredited, largely because of the failure to control apple scab.

About ten years ago the use of Bordeaux mixture on apples was given up in the northern states and lime-sulphur solution was substituted for it. Some time previous to this, Paris green had given way to arsenate of lead as more effective for the control of chewing insects. The latter insecticide appeared on the market in powdered form at about the time that lime-sulphur solution became popular.

In view of the fact that lime-sulphur solution quickly disintegrates when sprayed onto trees, leaving only elemental sulphur as the effective fungicidal ingredient, and in view of the fact that the few early trials with powdered arsenate of lead had given good control of the codling-moth, it seemed that very fine sulphur combined with powdered arsenate of lead might prove effective as a substitute for the lime-sulphur-arsenate of the lead spray mixture. Experiments were planned to make such a comparison of dust and spray under New York conditions and a summary of the results is presented here.

PLAN OF EXPERIMENTS.

Dusting machines were secured and experiments were performed, beginning in 1911 and ending in 1915, to make a direct comparison of the two methods of treating apple trees. In the later tests, large blocks of trees were employed and the experiments may be regarded as having been done on a commercial scale. Untreated trees were always left for comparison. In 1915, seven experiments were performed in five different counties in New York. Various combinations of dust materials were compared with the standard spray treatment of lime-sulphur solution and arsenate of lead.

THE TIME FACTOR IN DUSTING.

The time factor in orchard protection is presented in some detail elsewhere. It was the problem of making treatments at critical times that lead to the inauguration of the dusting experiments. New York orchardists have only a few favorable days in which to make effective treatments and in many cases their acreage is so large that they had difficulty in covering their orchards with a protective spray at the proper time even when applied with the very best equipment then available.

Dusting was found to be a much more rapid method of treating trees than was spraying. How much more rapid depends largely on how well equipped a grower was for spraying. In the various experiments, the relative time varied considerably, depending largely on the conveniences at hand for spraying. In general, six or eight times as many trees could be dusted in a given time as could be sprayed. A direct comparison is not practicable because, in spraying, the time consumed at the tree was the important item (aside from the time required to drive to and from the filling station and the time required for filling) whereas in dusting, the outfit does not even pause at the tree and the number of trees covered per day depends on how rapidly the team can walk and the distance between trees.

MATERIALS FOR DUSTING.

The essential fungicidal ingredient in all the dust mixtures tried was ground sulphur of such a fineness that practically all of it would pass a silk cloth of 200 meshes to

the inch. This is much finer than the ordinary ground sulphur commonly found on the market. The insecticidal ingredient used in the work was powdered arsenate of lead of a very fine, fluffy type. There were tried in various combinations, the mixture best adapted for general use is one containing 90 parts of special dusting sulphur and 10 parts powdered arsenate of lead. In seasons when scab is not an important factor, from one-third to one-half of the sulphur may be replaced by an inert material such as finely powdered gypsum, or with a material that may have some value as a contact insecticide.

A mixture known as 90-10 and one as 85-15 are on the market. The first number refers to the proportion of sulphur, the second, to arsenate of lead. When a diluent is used the formula might read 50-10-40 or 45-15-40, the last figure referring to the proportion of the diluting material.

Growers may compound their own mixtures for dusting and thus vary the amounts of the essential ingredients to suit special cases. When this is done, it is practically necessary to procure a special sifter and mixer for the purpose.

AMOUNT OF DUST APPLIED PER TREE.

It is not always possible in experimental work involving different dust mixtures to apply a definite amount of material per tree. Some mixtures flow more readily than others and very large trees require more material than small ones. Trees up to 20 years of age usually may be well covered with one pound of material. For older trees material to the extent of two pounds is usually required, and for very large old trees as much as two and one-half or even three pounds may be required. Trees treated in this way do not show evidence of the dust but with a magnifying lens it is found that leaves and fruit are well coated with the minute particles.

RELATIVE COST OF DUSTING AND SPRAYING.

Cost accounts were kept in all of the work, but it is not possible to make a definite statement of relative cost because of the wide variation in time required to perform the two operations. The cost of materials for dusting was about twice as great as for spraying, but the cost of making an application of dust was much less than for one of spray. In general, the total cost per tree was about the same. Such

a statement, however, does not take into consideration the fact that the time and labor saved by the dust method usually can be applied with decided advantage to other farm operations, or the equally important fact that the orchard may receive a complete protective treatment at a critical period. The important thing in the whole operation of spraying or dusting is to secure fruit free from blemish, and, after all, the cost of treatment per tree or per acre, usually is not the one that most concerns the grower.

RELATIVE EFFECTIVENESS OF DUST AND SPRAY.

The best index of the relative effectiveness of dusting and spraying, in the experiments, may be found in the percentages of fruit free from preventable blemish. The results of those experiments in which significant differences between treated and untreated plats occurred are shown in Table 1.

Table 1. Percentages of fruits free from preventable blemish in untreated, sprayed and dusted plats in the New York experiments in 1915.

	Bald- win.	Maiden Blush.	Twenty Ounce.	Green- ing.	Bald- win.	Green- ing.	Bald- win.
Untreated	50	61	49	8	50	37	29
Sprayed	80	83	53	76	87	77	74
Dusted	85	85	58	68	82	84	74

It is to be noted that in most cases the results are slightly in favor of the dust method. This was the case in so many of the experiments that it is regarded as a result to be generally expected.

The figures presented in Tables 2 and 3 seem to show that arsenate of lead applied in the dry form is more effective for the control of codling-moth than when applied as a spray, and that for sulphur the solution is more effective for the control of scab than is the dust. The number of conclusive experiments on codling-moth control, however, are not very large.

Table 2. Percentage of fruits attacked by codling-moth in untreated, sprayed and dusted plats in some of the New York experiments.

	1912	1913	1915	1915	1915
Untreated	37	46	29	16	16
Sprayed	6	42	11	8	3
Dusted	1	27	6	3	3

Table 3. Percentage of fruit affected with apple scab in untreated, sprayed and dusted plats in some of the New York experiments.

	1913	1914	1914	1914	1915	1915	1915	1915
Untreated	80	37	67	98	22	78	28	17
Sprayed	21	7	19	32	1	0	2	2
Dusted	33	4	43	50	1	7	5	3

Sooty blotch was prevalent only one year and then only in four orchards. The control of the disease by dusting was entirely satisfactory, but, as with scab, the percentage of apples affected was slightly greater on most of the dusted plats than on the sprayed plats. Tent caterpillars were prevalent only once. They were readily killed by a single application of dust mixture containing 10 percent of arsenate of lead.

RESULTS IN SOME OTHER STATES.

Childs in Oregon reports that he has duplicated the New York results for four successive seasons. Dutton in Michigan has had favorable results in two out of three years. Sanders and Kelsall in Nova Scotia had very striking results in 1919; and various other Canadian reports indicate that orchard dusting gives satisfactory results.

The Nova Scotia experiments are of special interest because in one case the essential fungicidal ingredient was copper rather than sulphur. The data show a little better control of scab with sulphur than with copper but the difference is not great. The copper dust is different than "Bordeaux dust", which has been tested in Vermont and elsewhere for the control of potato blight. A copper dust of the same type as was used in the Nova Scotia experiments came on the market while the apple dusting experiments reported above were in progress; but under New York conditions there was no occasion to test the copper dust on apples since the diseases to be controlled were amenable to sulphur treatment. The material was tested on potatoes with satisfactory results but the experiments were not extensive and have not been reported.

In some trials the results were as good as those for bordeaux mixture, but this was not true in the Nova Scotia experiments of 1919.

PRACTICAL EXPERIENCE OF GROWERS.

The experiments were followed with keenest interest by growers, and some of those having large acreage had pur-

chased dusting outfits. It is now evident that the experimental work should have been continued another year. The spring of 1916 was exceedingly unfavorable for work in the orchard. In some instances spray tanks, half full could not be dragged through the orchard with four horses. This furnished an opportunity to determine whether the light dusting outfit could not have been employed in making supplementary applications to good advantage. Unfortunately no such tests were made, and it may be years before another such opportunity occurs. In that season growers failed to control scab either with dust or spray, and in general the amount of scab in dusted orchards was greater than in sprayed ones.

SOME GENERALIZATIONS.

Dusting is and has been an auxiliary orchard practice. It is not a substitute for spraying because dry, contact insecticides have not been developed for the control of such pests as scale and aphis, both of which are likely to be destructive in most New York orchards. The discovery of powdered materials that will kill insects by contact will entirely change the situation. Indications that these may be found are already at hand but such work is distinctly in the experimental stage.

In 1916 orchardists were offered a nozzle—the spray gun,—new to orchard work, which has enormous capacity compared with the old mist-spray nozzles. With such a nozzle the long wait at each tree is very much reduced or even avoided, and it has been made possible for numerous growers to continue with their old equipment and finish their spraying in due season.

Whether Vermont orchardists will be interested in dusting is likely to prove an individual problem. Hilly or stony ground, lack of water, shortage of labor or of equipment may be the determining factors. The dust method is being tried in many places. It appears to be a success in some places and a failure in others. If there is a general desire on the part of growers to reduce the time required to treat the orchard this society might well initiate experiments to determine the adaptability of this method for Vermont conditions.

Some references to Literature on Dusting Apples:—

Cornell University Agric. Exp. Sta. Bulletins 340, 354, 369.

Michigan Agric. Exp. Sta. Spec. Bulletins 87 and 102.

Annual Rept. Nova Scotia Fruit Growers' Assoc. for 1918, and for 1919; 77-94, 1920.

Illinois Horticultural Soc. Transactions for 1916 and for 1917.

Jour. Econ. Entomol. 13; 331-338, 1920.

Virginia Agric. Exp. Sta. Bull. 223.

West Virginia Agric. Exp. Sta. Bull. 167.

Month. Bull. Ohio Agric. Exp. Sta. 5; 147-153, 1920.

DUSTING AND FARM PROBLEMS.

W. S. DROMAN, MIDDLEPORT, N. Y.

There is no more timely topic for discussion by a body of horticulturists than the relative values of dusting and spraying for the control of insects and diseases on fruits and vegetables. Undoubtedly you are all aware that dusting is a much older method than spraying with liquid. Dusting was used in France and in California several years before the liquid method. Those machines were thrown on the scrap heap as worthless. Later these same ingredients used in liquid form gave fairly good satisfaction. Then the scientists were puzzled to know why the dust did not give the same control as the liquid having the same chemical composition. For a number of years the best scientific minds of the country were unable to solve the problem, but about twelve years ago they discovered the reason for the failure of the earlier machines. Like most problems, when once solved it all seemed very simple. The dust first used was ground about as fine as ordinary flour. This of course was too coarse to become imbedded in the fine surface of foliage, or enter its pores; hence the slightest breeze would blow it off and the plants received no benefit. For this reason the dusting method received a black eye from which it has taken nearly half a century to recover. Now that the trouble has been found and the remedy applied, this better method is spreading not only all through this country but also to Canada, Mexico, South America, China, Japan, Australia and many other isles of the sea.

Even those expert entomologists of some of our agricultural colleges who a short time ago in the press, on the platform and in private conversation ridiculed the dusting method are today speaking in its favor or keeping silent. Others are doing in substance what one of the most violent objectors from the New York State Agricultural College did

a year ago. One of the ex-presidents of the New York State Horticultural Society who has a very large orchard said to this entomologist: "Now, Mr. Expert, you know how many acres of orchard I have, and you know the labor problem, and the difficulty of spraying so many trees in rainy seasons at the proper time,—tell me, sir, just what I am to do." Whereupon the expert made a noble confession. "After all I have said and done," he answered, "against dusting for the last seven years, I am ashamed to say it out loud, so I am going to whisper it in your ear—I see no solution for your problem except dusting." Today that prominent fruit grower is an advocate of dust.

It is indeed significant that nearly every important experimental agricultural college in the land is testing the relative values of dust and liquid. We have definite experimental evidence from New York, Michigan, Ohio, Maine, Illinois, Minnesota, Georgia, Virginia, West Virginia, Ontario, Nova Scotia and others. Let us call the roll of these states and hear their answers through their experimental stations. Minnesota, what do you say of the relative values of dust and liquids spray? 'A larger percentage of fruit was marketable where dust was used.'

West Virginia: "The average percentage of sound peaches by spraying for 1915, 1916, 1917 was 30%. By dusting for the same years, 34.1%." Virginia: "Satisfactory control of scab and codling moth in 1917 by dusting on Regan and Gano varieties; 1919 good control of blotch and codling moth with 80-10-10 dust." Georgia: "The average percentage of sound peaches by spraying for 1914 to 1919 was 82.7%, by dusting 88.5%. Mr. Chase of the State entomologist office says in an address before the State Horticultural Society that dust will control brown rot as well as liquid, and is far superior as a preventive of scab."

Illinois: Prof. Flint of the station says "We have found dust quite as effective for control of insects and diseases as spray, but the average percentage of sound fruit for four years by spraying was 1½% greater than by dusting."

Michigan: "The average percentage of sound fruit for four years 1915-1919 was 78.4, by dusting 78.8."

Nova Scotia: "Average percentage of sound fruit for 1916, 1917, 1919 by spraying was 87; by dusting 91.2."

New York: "Average percentage of sound fruit for four years by spraying was 65.9, by dusting 70%."

The question is often asked "Is not dusting more expensive?" The material may cost a trifle more, but that is more





A DUSTING MACHINE MOUNTED ON TRUCKS, DRIVEN BY MOTOR POWER, AND DRAWN BY HORSES. THE OPERATOR DIRECTS THE DELIVERY TUBE AT WILL TO DUST HIGH OR LOW, LITTLE OR MUCH; AND CAN DUST MORE TREES IN A GIVEN TIME THAN CAN A SPRAYMAN.

than offset by the saving in time, labor and disposition. The experimental tests made to determine the relative costs vary with the locality, cost of labor, distance water must be hauled, number of times the nozzles clog, etc. As with the control, so with the cost, they run about parallel. One of the most extensive tests at the Nova Scotia Station, gave a cost of \$22.97 for spraying one acre four times; for dusting the same four times \$22.87, a difference of 10c in favor of the dust. But that is insignificant. The great difference comes in not being able to cover the whole orchard at the proper time, and thus losing a portion of the crop. Mr. Chapin, of Batavia, N. Y., informs me that he always watches for the exact time to make the application and then dusts his whole 50 acres in one day. Mr. Grinnell of the same place tells me that he never spends over a day in dusting on both sides of the trees of his 40 acres of forty-year-old Baldwins. Thus these two expert orchardists, who have used nothing but dust for five years, claim that dusting is cheaper not because of the difference of 10c an acre, not only because of the saving of three or four days time which may be utilized in caring for other crops, but because they can always treat all their trees at exactly the right time and thus save all their fruit instead of merely a part of it.

Another question frequently asked is how much dust is necessary per tree. In my own case, I secured perfect control by using 100 lbs. 20-10 dust for each of three applications on ten acres of ten-year-old apple trees. Mr. Grinnell on his orchard just mentioned kept an accurate record of the number of pounds he used for four years, making from three to seven applications per year. By dividing the total number of pounds used by the total number of applications for four years and that quotient by the number of trees, he found he had used 1 1-3 pounds per tree per application. He says he is entirely satisfied with the results. I have never found it necessary to use more than 1½ pounds per tree. If any more used than is necessary to form a bluish fog, it is wasted.

Having called the roll of the experimental colleges let us see what some of the larger and more important individual growers say. H. H. Freeman, Middleport, N. Y., who has used nothing but dust for six years says he would as soon cut his wheat with a cradle as to spray his forty acres of orchard.

G. A. Pearsall, Williamson, N. Y., who has used dust the last three years on his 100 acres of orchard says in his

letter of Oct. 22, 1920, that out of 1153 barrels of A grade MacIntosh, "I do not believe there were 25 bushels of fungus apples. We are satisfied with the results of dusting."

B. J. Case, Sodus, N. Y., who is one of the best and largest growers in the state, in his letter of Oct. 30, 1920 says, "We used dust ever since the first machine came into this section. The dust would check the codling moth and lesser apple worms better than the liquid. We used more dust this year than ever before, and are planning to use still more this coming season."

APPLE BARREL FACING.

W. M. PEASE, ROCHESTER, N. Y.

Facing is a universal practice. Almost every commodity offered for sale is faced. Storekeepers face their stocks with window displays; banks face their resources with handsome granite and marble buildings and massive safe-deposit vaults; our politicians face their appeals for office with wonderful promises; even nature herself faces our orchards at harvest time. Any buyer who has ever purchased lump orchards or tree run stock will swear to this last statement. Our proposition then deals with the best methods of facing.

Good facing is really an art. A face primarily should represent what a purchaser would reasonably expect to find in the remainder of the barrel. You note I say "reasonably"—no one ever reasonably expected the remainder of the barrel would be as good as the face; a person has a reasonable right only to expect it to be nearly as good.

A first-class face has three requirements:

FIRST:—Evenness. We are all attracted by pleasing proportions; the lines of an automobile, the cut of a suit of clothes—evenness of proportions always appeals to us. So with the face of a barrel; it should be even, every apple should be of like dimension, and uniformly arranged.

SECOND:—Good Color. Seek it in the red varieties; a blended face is better than a straight face in all deep red apples, unless it is impossible to fill the barrel with all perfectly red apples. A face moderately colored does not present too great a contrast with the remainder of the contents of the barrel. By a "blended" face, I mean apples of medium color, arranged with the reddest ones in the center and toning the color down toward the outer edge.

THIRD:—Smoothness. Every apple in a face should be absolutely free from any skin blemish. In presenting a face we are presenting a picture. We all know what a blot or mark will do to the value of an art production,—it has the same effect on an apple face.

We have then these three factors,—evenness, color and smoothness, properly arranged and blended, to make the barrel a saleable product.

A law is being proposed requiring a face to be the same size as the remainder of the barrel. I doubt if this would be successful. A face is much like the minister of a church; we all expect him to be a little better than the rest of us—that's why the most of us prefer to be members of the congregation in place of the preacher.

Two and three-quarter inch apples are best for facing; they are the most practical size, making the best fit in the head of the barrel, and can be used on two and three-quarters and two and a half inch packs. Two and a half inch face is best for a two and a half inch pack, and two and a quarter inch for a two inch pack. This is not dishonest or misrepresentation, although it savors slightly of puffing. An automobile guaranteed to climb any hill on high and attain a speed of 60 miles on the level, is not really expected to do this except on rare occasions. The day may come when facing with small apples will be adopted, but we have forty years of precedent and old human nature to battle against, and many of us go broke when we start pioneering. Mr. Wardwell, at Medina, New York, 40 years ago invented the modern apple barrel hoop, which really made the barrel a commercial possibility; he was a wealthy man when he developed this invention but the result was bankruptcy, and it was a number of years later before the trade began using it. Our best outlook now is to adhere to the present method and carry it on with as much improvement as we may be able to bring about by careful selection of faces and the use of artistic arrangement, such as the variety of fruit we are packing will allow.

After these remarks a demonstration was given of a barrel-facing device by which apples are placed on a round panel the size of barrel heads. After placement the barrel is placed over the panel of apples and the barrel reverted to the floor with face layer in place and the device is then removed for use again.

SELECTING AND JUDGING EXHIBITION FRUIT.

PROF. F. C. SEARS, AMHERST, MASS.

I will take up the question of judging fruit first, since I believe we can understand better the points to be observed in selecting fruit, if we know how the judge is likely to perform his function of judging.

In the first place all judges work on the basis of some type of score card. Sometimes they actually score the different exhibits, and at other times they merely judge them with the score card in mind. These score cards have been worked over for many years and changed in various ways, and for different types of judging somewhat different types of cards are probably desirable. The three given below represent perhaps as well as any the variations that exist. It will be seen that in number one the item "quality" is included, while in the other two this point is omitted. This question of whether or not to include "quality" is a debated one and has never been conclusively settled. Probably the ideal way is to include it and to have on the plate of apples a specimen which can be cut by the judge in making up his award, but since we seldom realize our ideals this practice is almost never carried out and there are many difficulties to excuse this neglect on the part of exhibition managers and judges. The principal one being that only a few varieties of fruit would be in the best condition to eat at the time of the exhibition.

It will also be seen that the American Pomological score card,—number three, uses the term "condition" instead of "freedom from blemishes," and with some judges this is considered to be a distinct improvement. Personally I prefer score card number two for most purposes partly, no doubt, because I have used that more than the others.

SCORE CARD No. 1.

New England Fruit Show.

Form,	10
Size,	10
Color,	20
Uniformity,	20
Quality,	15
Freedom from blemishes,	25
<hr/>	
100	

SCORE CARD No. 2.

New England Inter-Collegiate Contest.

Form,	15
Size,	15
Color,	20
Uniformity,	20
Freedom from blemishes,	30

100

SCORE CARD No. 3.

American Pomological Society.

Condition,	30
Color,	20
Form,	15
Size,	15
Uniformity,	20

100

In the actual judging work three different methods may be used. In the first place the judge may take each plate or each box or barrel and score it point by point, then add up his points and award the first prize to the exhibit having the highest score.

In the second place he may start in and merely throw out those lots which seem to him to be the poorest, without any scoring, and by this process of elimination gradually get down to the two, three or four exhibits which are to have prizes and then arrange these in the order in which he thinks they ought to stand.

In all of this work he will, of course, either consciously or unconsciously have in mind the score card as a test for the excellence of the different exhibits.

In the third place he may use a combination of these two methods, going over the exhibit first and scoring it, then going over a second time and judging *it* by the process of elimination, and finally comparing the two results and attempting to harmonize them. For really close competition this, in my opinion, is the ideal method.

It ought to be said here that the points in the score card are based on commercial value and that while in judging we refine our method a good deal, and draw much finer distinctions than we would in commercial practice, yet after all we emphasize color because color is important in market-

ing apples, and we emphasize freedom from blemishes because people do not like to have worm-holes in their apples.

Let me now suppose that the judge is going over a plate of apples, or a number of plates, in some section like McIntosh, and attempt to follow his mental processes in deciding which plate ought to have first prize and which second and third. We will suppose that he is using the score card method and that he is taking score card number two as his basis. The first item is "form" to which 15 points out of 100 are given, and he scores down apples which are "off-type", that is, not of the typical form of the variety and of course those which are decidedly out of shape. In the former case he is probably carrying the matter further than the commercial man would, but as I have said before he is merely refining the method of the commercial grower.

The second item in the score card is "size" and on this point he scores down for small apples and usually for extra large apples. As a matter of fact the New England Fruit Show prize list attempts to give ideal sizes of the different varieties, and says that apples larger or smaller will be scored down. Doubtless mistakes were made in deciding on these ideal sizes, but at least it gives something definite for both the exhibitor and the judge.

Formerly, in the matter of size, the exhibitor was always at sea as he did not know what type of judge he might meet. One judge giving everything to large size fruit, and another judge emphasizing quality and other points almost to the entire exclusion of the question of size. In the opinion of the writer, one of the best things the New England Fruit Show did, was to standardize sizes for the various varieties. The size given, is the transverse diameter of the apple.

The third item in the score card is "color" and this probably needs little defense, since we all recognize the fact that highly colored fruit sells much better than poorly colored. In judging color we usually take into consideration three different phases of the matter. First the depth and attractiveness of the ground color, that is the yellow color or green color underneath the red; second the question of whether the red color is characteristic of the variety, and third the amount of this over-color or red. The question sometimes arises as to whether apples can be too highly colored, and in my opinion they can. I think that it is quite possible to have so much color on a Baldwin or a

McIntosh that it is not as attractive as a somewhat lighter shade would be.

The fourth item in the score card is "uniformity" and this, as in the other items, is merely introducing what the commercial grower recognizes, that if his apples are uniform in size for example, his customer is better pleased than if they varied decidedly. They ought to be uniform in form, size, color and in the degree of ripeness. In extremely close competitions I have seen the question between two plates decided by the fact that one grower selected five apples having the same type of stem, while his opponent had some with long stems and some with short stems.

The last item in the score card is "freedom from blemishes" and under this head apples would be scored down if they had any kind of blemish. This would include the insect injuries of any kind, fungus diseases or mechanical injury such as loss of the stem, bruises, stem punctures etc. This is perhaps one of the most difficult questions to settle when one is judging fruit. My own practice has been, and I think it is a good one, to score heaviest on those blemishes which indicated neglect, or which showed the work of especially dangerous pests; and this would mean discounting much for San Jose scale and codling moth, and but little on stem punctures or bruises, or russetting due to spraying.

HOW TO SELECT THE FRUIT.

In the selection of fruit, the following points are worth consideration.

First of all the fruit ought to be selected in the orchard from the tree and not in the packing house after the fruit has been gathered. While it may be possible by the second method to get out a prize plate or even a prize box, it is certainly far more difficult and much less satisfactory than if one goes directly to the orchard and selects from the trees, specimens which look best. Of course a larger number of those picked, will prove to have some slight blemishes and these must be laid aside, when seen closely.

In the second place the ideal way is to use a picker of some type, one of those with wire cages on the end of a long pole is handy. With this it is possible to get the fruit without wasting much time in the operation and without knocking off fruit as one must necessarily do if he attempts to put up a ladder for each specimen he wants to get.

In the third place one is likely to be most successful if he picks from the south side of the tree as that is where the highest color develops. Occasionally, in very highly colored fruit, the north side may be equally good or even better, but ordinarily the south side is to be preferred.

In the fourth place one should get plenty of fruit. If one is asked for a plate of five apples he ought to have two or three dozen to select from in making up his plate and the keener the competition is likely to be in the show, the more specimens he ought to have.

In the fifth place the fruit must be handled carefully, like eggs. This point ought not to need emphasis, but with most people it does, and even those who have had experience and who ought to know better, will toss exhibition fruit around in a way to make one shudder.

In the sixth place the fruit ought to be wrapped, if it is to be kept any length of time. This keeps it in better condition and guards against bruises in packing.

In the seventh place the fruit should be stored under the very best conditions possible. This usually means in the lowest temperature that is safe although if it is a variety which is to be exhibited before its season one may hasten it in maturing and developing color by putting it in a warm place.

In the eighth place the fruit should be put into closed containers, preferably boxes, which can be closed up tightly.

In the ninth place leave the selection of fruit just as late as possible. It is surprising what two or three days even will do in improving fruit as to color and size and general appearance.

In selecting the samples to be put on exhibition one needs plenty of time to work, and all the patience he can command, as well as all the judgment, if the competition is likely to be at all keen. The best way is to begin and lay out several different types of apples, putting together all those of one type that may be in the two or three dozen or more which have been selected. Then from each type make up a plate of five specimens and lastly choose among these plates that one which most clearly meets the ideal in mind. Of course it is astonishing how frequently one will have four apples of a type but cannot find the fifth one. The last apple will be too large, or too small, or too highly colored or not colored enough; so a large quantity of fruit is helpful.

In closing this discussion just a few words in general on fruit exhibitions.

In the writer's opinion it is very desirable indeed to give the judge an opportunity of discussing his awards with the exhibitor. This has two or three valuable results. In the first place it educates the exhibitor, in the second place it frequently educates the judge, and in the third place it gives a chance to smooth out differences of opinion and very frequently an exhibitor who has been displeased with an award previously, may be entirely convinced that the judge was correct in his award.

A point which ought not to be overlooked in the value of an exhibition is that it educates both the exhibitor and the consumer; particularly the latter. There can be no question that such exhibitions as the New England Fruit Show, recently held in Hartford, do a wonderful work in showing people fine fruit and in getting them interested in the use of fruit. The man or woman who looks at a wonderfully fine show of McIntosh or Baldwins is bound to be more enthusiastic in securing his supply of fruit for the winter.

It ought also to be said that probably no man yet "came out even" on expenses who took any quantity of fruit to a fruit exhibition, even though he might take prizes; for with the time required to select fruit properly, to pack it, take it to the exhibition, to put it out on exhibition and pack it up again after the show is over, he cannot expect to get his money back, but must get his satisfaction and his financial return from the indirect results of the show in stimulating interest and increasing the consumption of fruit.

I firmly believe that exhibitions are an indispensable factor in the fruit business. Let every grower make up his mind to do his share by exhibiting, even though it may be at some temporary expense. He will get his money all back, and will have the fun of exhibiting in addition.

RECENT DEVELOPMENTS IN THE PRACTICE AND PRINCIPLES OF PRUNING.

**J. K. SHAW, MASSACHUSETTS EXPERIMENT STATION,
AMHERST, MASS.**

In discussing the principles and practice of pruning this morning I shall have the apple in mind as that is the fruit you are most interested in and the only tree fruit generally grown on an extensive scale in the state. The old books on fruit growing written nearly a hundred years ago discuss the subject of pruning more at length than some of the later ones. This is doubtless because in Europe where trees are pruned and trained to more or less definite forms, pruning played a greater part than it does under the more natural practices in this country and the old writers drew much from European sources. Since the development of commercial fruit growing, growers have followed diverse practices and the teachings of the books and class room have on the whole added to the confusion. Within the last ten or fifteen years there have been carried out many experiments in pruning which it is to be hoped will tend to bring order out of confusion so that we may in time be able to lay down directions for intelligent practice in the orchard. I would not be understood as saying that rules can be given that will render unnecessary skill and judgment in the orchard, for that will always be necessary. Without discussing in detail any specific experiments it will be my effort to interpret in terms of orchard practice some of the things we have learned about pruning.

Let us keep in mind from the start that the buds now on the trees will produce leaves and that these constitute a factory in which starch and other products are manufactured, from which comes the new growth that is necessary for the continued welfare of the tree and the fruit which is the reward of the orchardist. Whenever we remove a branch it takes with it a certain number of buds and the leaf area and the starch producing power of the tree are reduced.

I would also call your attention to the fact that the new growth in length all takes place in a short space back of the growing tip. Every leaf bud is a possible branch which may or may not start into growth within one or two years after it is formed; if it does not start the second year it

commonly dies and falls off. During the second and all following years the shoot puts on a new layer between the bark and wood, part on the bark and part on the wood, this giving rise to the annual rings.

If conditions are such that the lateral buds grow only an inch or two it is on the way towards developing into a fruit spur, and one of the objects of pruning and indeed all orchard practices is to encourage as many buds as possible to develop in this manner. With some varieties as Ben Davis and McIntosh fruit buds develop on the end of longer shoots. In the Wealthy, Wagener and some other varieties fruit is borne on lateral buds on the previous year's growth but fruit so borne is often misshapen and is of small value. Fruit spurs very seldom bear two years in succession and when trees bear annually it is commonly because some spurs bear one year and some the next. It was formerly thought that thinning the fruit would bring about annual bearing but experiments show that usually no such effect is produced. Removing the blossoms before the fruit sets may however change the bearing year.

It was formerly asserted that heavy pruning stimulated growth and in a way this is true; the smaller top is forced into growth by the ample supply of sap from the roots and strong growth results. Whenever a healthy branch is cut from a tree, that tree will ever after be smaller than it would have been had no pruning been done.

Average increase in trunk diameter.

SEASON OF 1919—MILLIMETERS.

	No. trees.	Thinned and cut back.	Thinned not cut back.	Un- pruned.
Baldwin	120	17.6	17.3	18.2
No. Spy	120	13.9	15.3	14.2
R. I. Greening.....	120	13.6	15.9	18.0
McIntosh	120	16.6	16.6	16.0
King	120	12.8	14.7	16.1
	600	12.2	16.0	16.5

The differences are not large but as they represent one season's growth and a considerable number of trees they can be regarded as significant.

When we prune the tree, we either head it back or thin out the top. The former term is applied when we cut off a part of the previous year's growth or when we cut back a leading branch more severely into two or possibly three year old wood. There is considerable difference in the

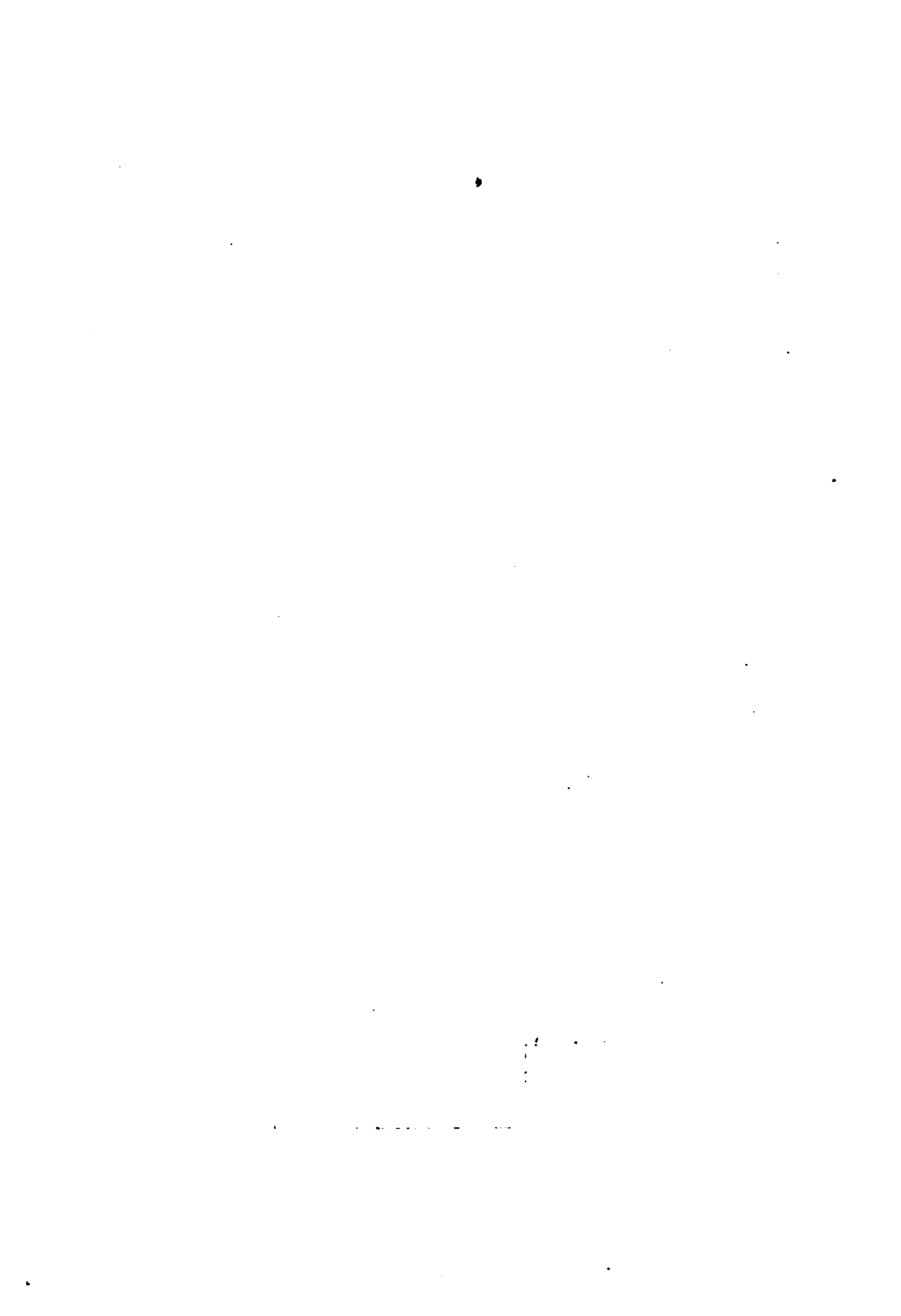
response of the tree according to which of these is followed. If we cut back only into one year old wood the usual result is that two or three buds nearest the cut end start to vigorous growth and we have two branches where one grew before. These compete with one another and with other similarly cut back shoots if there be any and they start a race for light and air. Thus efforts designed to keep the head of the tree low are frustrated. If this sort of heading back is practised it must be followed by a thinning out at once of the superfluous branches so that those desired permanently may have opportunity to throw out side branches and make a stocky growth.

There has been much discussion of the value of cutting to outside buds with the object of spreading the top. I must confess to having been rather skeptical about the effectiveness of this practice but some observations during the past year at the West Virginia Experiment Station on some Yellow Transparent and Stayman trees, cut to outside and inside buds seem to indicate that there is something in it and that the form of the tree may be sensibly effected in this way.

If we head back into older wood the effect is somewhat different. In such cases we should use care to cut to a lateral branch, even a small one, as the dormant buds may be too weak to start. This may start out dormant buds but commonly most of the surplus energy of the tree will go into branches already started. If one feels that he must head back it is often advisable to cut back into two year old wood.

There are certain results of heading back one year wood that call for further consideration. The branches that are forced out from lateral buds form a sharp angle and do not develop such a distinct collar as when no cutting back is practised. This will vary with the variety but it is always more or less pronounced. It results in a weak crotch and increased danger of breaking when the tree comes into bearing.

It is well established that heading back young trees delays bearing. In one experiment at Amherst this effect seems to come about in this way: On the cut back trees most of the lateral buds remain dormant while some start out vegetative growth making side shoots three inches or more in length, while on the trees not cut back many of these lateral buds grow out an inch or so in preparation for bearing blossom buds and becoming fruit spurs.





DEMONSTRATIONS AND MEETING IN ORCHARD OF LUTHER PUTNAM, AT CAMBRIDGE. ONE OF THE EARLY ORCHARDS
WHERE MANY VARIETIES WERE TESTED FOR RELATIVE MERITS.

There is much argument as to whether or not young trees should be headed back. It seems to me that heading back is to be avoided whenever possible. Some of its bad effects have been pointed out. It also tends to cause the head of the tree to become too thick for best results, yet there are some varieties such as King and Stayman and possibly Baldwin that make rank straight growth and do not branch freely, when it seems as though heading back must be resorted to. We have had good results at Massachusetts by setting one year whips without cutting back at all. The growth was poor the first year but the second year, the limbs made an excellent growth branching freely nearly to the ground and giving a good opportunity for choosing branches to form a strong framework for the tree. If soil conditions were poor such a practice might result in high headed trees.

There is much argument about the form of head to be chosen for best results. Some advocate a cluster of three to five branches coming out in the space of about a foot of the trunk giving a vase formed or globular headed tree; others have advocated continuing the leader indefinitely with many smaller branches coming out at intervals on this leader; while others argue for a compromise between these two ideals and strive for what is known as a modified leader tree. Somewhat similar to the last is the two storied tree when two groups of scaffold branches are brought out at an interval of eighteen inches or two feet.

In practice it is difficult to bring all trees of all varieties into any one of these forms. The main purpose to be kept in mind is to keep the scaffold branches well balanced and well separated along the trunk and to develop a strong union of the trunk and branch so that it will not split off when loaded with a crop. This will result in a modified leader or a central leader tree. Some have objected to this through fear that it will result in the trees becoming too tall. Central leader trees will be taller during the first few years but measurements of many mature trees show that central leader trees are no taller than vase formed trees.

In handling young trees and choosing the shoots that are to form scaffold branches one should keep in mind the tree as it will appear when mature; when the scaffold branches have become six or eight inches in diameter, and see that they are well distributed around the tree and well separated, especially the latter.

When the scaffold branches are chosen they should not be allowed to form into two branches of equal size; the

same may be said of the leader. If such a fork appears one branch should be removed or be severely cut back. When parallel or crossing branches appear one of them should be removed.

It may be gathered from this that the speaker believes in rather light pruning for young trees. Follow the suggestions just given and cut out weak shoots in the center of the tree. If the trees are gone over every year it will be found that comparatively little work will be needed.

Varietal differences are of more importance in pruning than is generally thought. Varieties differ in vigor and habit of growth. Northern Spy makes a light tree in the nursery but with age it becomes a strong grower. Wagener and Wealthy make fairly strong trees in the nursery but lose vigor in the orchard. Rhode Island Greening and King make tremendous growth in the nursery, the former continues to grow well in the orchard while King loses vigor but not so quickly as Wealthy. Baldwin and McIntosh are good growers both in the nursery and orchard. Yellow Transparent is a moderate grower all its life; it makes an especially light root system in the nursery row while Oldenburg makes a few large long roots and forms branches in a similar fashion; in fact there is in all varieties a marked correlation between the form of the top and the form of the root system even though the root system is of seedling origin.

The characteristic branch angles of different varieties giving rise to the form of the top are well known. Rhode Island Greening has a wide angle and a spreading top while the opposite condition is seen in the Northern Spy. This should be kept in mind in determining the height of the scaffold branches above the ground; no matter how high the head, the tips of the branches of Rhode Island Greening will come down to the ground in time.

Varieties differ markedly in the readiness with which the lateral buds start out into branches; McIntosh branches very readily while King make a long annual growth with few or no side branches. Northern Spy wood is brittle and breaks easily under a load of fruit, while McIntosh wood will carry a heavy load without breaking. Many other varietal peculiarities could be mentioned did time permit. The skilled orchardist will become familiar with these varietal differences and prune his trees with them in mind.

The pruning of mature trees is a somewhat different problem from pruning young trees. In the latter case the object is to make a mechanically strong tree that will come

into bearing early and produce good crops of high quality fruit, while in the former case the purpose is mainly to maintain maximum quality and quantity of fruit. It goes without argument that all dead and diseased wood should be removed as soon as discovered. Water sprouts should be removed at once as they offer a fine opportunity for blight to start and form cankers to the ruin of large branches. The only exception is when they are needed to renew the top when a large head has been removed. In such cases they should be given plenty of light and air so that they may early settle down into fruit producing wood.

Whatever further pruning is necessary should be confined to the removal of small branches where it is necessary to thin the top. Removal of branches over an inch in diameter should be avoided unless they are diseased or dying. Common sense would indicate that fruit spurs should not be disturbed. An exception to this may be made in the case of slow growing trees where the spurs are thick and unproductive. In such cases a moderate spur thinning may be followed by beneficial results.

Old neglected trees lacking vigor may be benefited by more severe pruning, yet commonly the indicated treatment for such trees is improved soil management. Even the extremely severe treatment known as "dehorning" sometimes gives good results, especially when it is necessary to lower the heads of the trees. In any cases where such heavy pruning is resorted to it is imperative to follow up the severe cutting back with persistent thinning out of the new growth lest in the competition of the new shoots for light and air they go up to as great height as the old tree before they come into renewed bearing.

The foregoing discussion has considered pruning during the dormant season only. Most experiments with summer pruning have given unfavorable results and it can hardly be recommended at the present time, yet further study may show when it may be practiced with advantage. As to the best time for dormant pruning it is commonly advised to prune in the spring and for practical reasons most pruning will be done at that season. Yet it has been shown that trees lose less moisture when pruned in the fall; less water escapes through the wound than would escape through the branch had it been allowed to remain on the tree all winter. There would seem to be no good reason why pruning should not be done in the fall after the season's activity has ceased, if time permits.

A word may be added concerning wound protection. It is commonly recommended that wounds over an inch in diameter be protected with lead paint or some sort of tar preparation. Almost any material applied to wounds is likely, sometimes at least, to cause more or less killing back of the cambium layer and thus delay healing. Moreover in most cases the protective covering does not cover the season cracks or checks that appear on the cut surface and these cracks form a fine place for spores of wood rot fungi to develop. Decay in wounds does not commonly start on the surface but the first decay is in the deeper tissues. Personally I am inclined to doubt whether protective coverings are worth the labor and expense involved in their application but would rather rely on spraying to protect wounds from the organisms of decay.

We may give a few minutes to a consideration of pruning tools. Most of the shears and saws found on the market are of very inferior quality both in design and material. It pays in the end to buy high grade tools even if the first cost seems high. The price of pruning shears has been high and the best types practically out of the market. We may hope now, with a return of more nearly normal conditions, that the situation will improve. Nine or ten inch shears are none too light for general orchard work. Personally I prefer those with the volute spring and it is important that the handles be large and strong enough to withstand heavy work without bending. The design of the cutting blade is important but hard to describe. The superiority of a well designed blade lies in its ability to cut the branch with the least effort and least strain on the blade.

Most pruning should be done with shears but a saw is often required. The narrow bladed meat saw type is preferred by many on account of the ease of operation. It requires some skill and experience to use one to the best advantage and they will not cut very large limbs. If one prefers the ordinary type of saw, one with a twenty-four inch blade four inches wide at the handle and one inch at the tip with five and a half teeth per inch is the most satisfactory for ordinary work; and see that it is made of the best of steel. A long handled pruner may occasionally be needed and a simple one of the Waters type is as good as any. Avoid the more or less complicated, patented devices that appear on the market from time to time. They are a delusion and a snare.

In conclusion I would urge that trees be pruned lightly

but regularly. Study the habit of the tree both varietal and individual. Picture in your mind the tree as you want it to appear in five, ten or twenty years and guide it toward that ideal. Practice good soil management so as to have a vigorous growth so you will have a reasonable abundance of wood to select from. Know something of the fundamental laws of tree growth, for the tree follows them invariably and success in achieving one's ideal in pruning can come only when one works in harmony with these laws. There is more pleasure to be had in shaping the growth of a young apple tree than in any orchard operation I know of. It equals in enjoyment sitting by the fire on a cold winter evening with a big pan full of choice juicy apples at one's elbow.

SOME ESSENTIAL FACTS IN ORCHARD PROTECTION.

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In the eastern areas of intensive fruit production it is true almost without exception, that the limiting factor for success is the control of insect pests and fungous diseases. The measure of success may be affected to some extent by faulty methods in pruning, cultivating, or harvesting, but the man who deliberately leaves his orchard unsprayed surely courts disaster. This fact is so well known that it is only the occasional individual who attempts to produce good fruit without spraying. Probably there is not a man here today who does not operate a spray rig in his orchard. However, there are some years in which successful results are not secured. In times past a favorite excuse for failure has been that the spray mixture was not up to standard. Under present conditions, however, with federal regulation of insecticides and fungicides, this excuse no longer is valid, unless, indeed, the grower deliberately deviates from standard practice. And yet it is all too true that in certain years, spraying seems not to have given the desired results; and in certain other years the abandoned and unsprayed orchard of Mr. Blank bears fruit practically free from blemish.

So far as orchards in western and northern New York are concerned, and the same thing is very likely true for most of Vermont, the two apple troubles of paramount

importance are codling moth and apple scab. Fortunately for the fruit grower, the codling moth has a very regular habit of entering the apple through the front door. A light luncheon of an arsenical placed in the entrance court while the doors are wide open is usually sufficient to dispose of the invader. The parasitic fungus which causes scab is not so easily disposed of. This fungus has no special portal of entrance. Any green and tender part of the plant affords a suitable place for growth and development (at least this is true for such varieties as McIntosh and Fameuse). The fungus always enters the tissue from the outside so that if the trees could be copper-plated or sulphur-coated throughout the summer there could be no scab. While it is impossible and impracticable to attain this condition it must be admitted that it is at least approached in the orchard which is treated five times during the growing season. This number of applications of spray may seem excessive to growers in Vermont but in many parts of New York it is regular practice.

Now the interesting thing—to the mere onlooker, is that it is almost possible for the orchardist to follow through the whole schedule of spraying and end in the season without having prevented the development of a single spot of scab. This extreme condition would probably be as rare in practice as it is to secure 100 per cent sound fruit in a "scab" year. In either case the secret lies in certain known facts about the behavior of the organism which causes scab.

First of all, this fungus,—*Venturia inaequalis*, passes the winter regularly in well developed igloos (*perithecia*) on the fallen, affected leaves of the previous year; and irregularly (McIntosh and Fameuse) under a corky layer on twigs affected the year before. In either case, however, the reproductive bodies of the fungus are not released until a drop of moisture gains entrance to the fruiting structure. Of course plenty of moisture is supplied, gratis, during the spring but a great deal depends upon the way in which the water comes. Moisture is not only required to release these spores, but it is also essential for their germination. A persistent drop of water for 12 hours or more furnishes the necessary condition. It will be seen, therefore, that at the right time in the spring, an inch of rain falling within an hour would allow the release of any ripe spores that existed but if the sun came out and the wind blew, the spores would not germinate for lack of water. On the other hand a trace of rain would be equally effective

in the release of spores and if followed by fine mist or dense fog for 24 hours would furnish ideal conditions for infection. As is well known, this fungus does not penetrate deeply into the tissue. It does, however, grow under the cuticle of leaf or fruit and once it has become established in this position can no more be reached with a poison than can the worm in the core of the fruit.

Now, suppose ideal conditions for scab, plenty of affected fallen leaves, spores ripe and ready, rain followed by heavy fog, should occur on the day that the first leaves of the fruit buds were pushing forth. Of the millions of spores released from this mass of old infected leaves an occasional one might get up to the expanding leaf. The spore receives an initial impulse but for the most part it is dependant upon wafting currents of air to carry it to the leaf. (Of course if the fungus were hibernating on an infected twig of the previous year the spore would be well elevated and the chance would be greater for it to lodge in a favorable place for growth.) The vast majority of the spores produced, fall in unsuitable places and die. But this "occasional" spore lodges in a minute droplet on the green leaf. The droplet persists because of the fog, the spore sprouts, the sprout penetrates the cuticle and begins absorbing nourishment from the tissue beneath. In the course of ten days or so the new parasite has grown so that it can be seen with the naked eye and very soon it produces a quantity of new spores.

Since this is a hypothetical season it might be well to introduce another favorable infection period about the time the blossoms begin to open. Many more leaves would be expanded by this time, consequently the infections from old fallen leaves would be more numerous than they were the first time. But if the season has not been too "forward" the crop of spores on the leaves which were infected early would be ripe and most of the new infections, in fact, would come from this source. To bring about this ideal condition for scab the blossoms should remain on the trees for about ten days or two weeks. This would allow for a great quantity of new spores to develop. Then some ideal weather for infection would assure that every young fruit became infected in at least one place, while some might become so severely affected as to die and fall off. In order to make the destruction complete this condition should be repeated in about three weeks.

From what has been said it will now be evident how a grower could make four treatments with the proper ma-

terials and yet fail to prevent many infections. He would only need wait until after these infection periods to spray his trees. It is true that some of the fungicide from each of the early treatments would be effective in preventing later infections but the enormous development of foliage and fruit during this period makes the actual area protected so small as to be negligible.

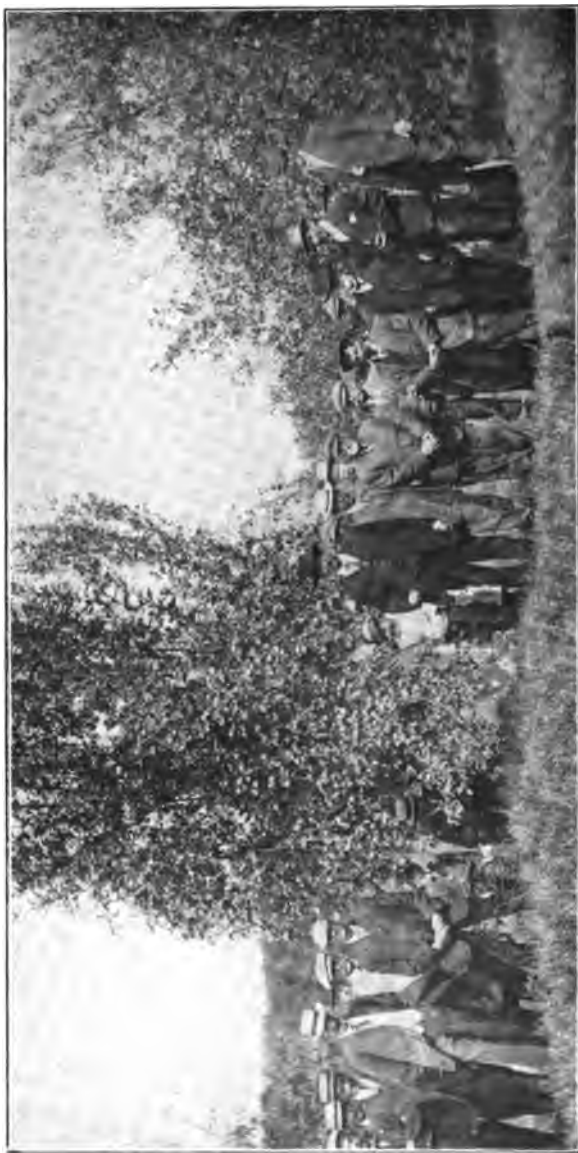
To put it the other way round, a thorough treatment with the proper fungicide before each of these storm periods would have given maximum protection. Unfortunately storm periods are not so conveniently nor so regularly spaced as in the hypothetical case just cited. In fact they are usually much closer together, especially in the early spring. And this means more need to spray also more difficulty in doing it because of wet ground. There have been a number of seasons in western New York when conditions were such (development of tree, wet ground, rain and fog) that the orchardist had about three days in which to treat his whole orchard. This is long enough for a small orchard on a big farm but for a large orchard on a very small farm it has been practically impossible for most owners to keep the equipment, men and teams to do the work in so short a time.

If the story is perfectly clear up to this point the remainder is quickly told.

1. It is always worth while to consider whether the management of the orchard will not allow for destruction of fallen leaves either by late fall or early spring plowing.

2. Weather conditions can be forecasted with greater accuracy than is generally supposed. Mr. L. F. Strickland a State Nursery Inspector stationed for many years in Niagara County, New York, with the aid of the Weather Bureau officials at Buffalo and Washington, has become very proficient in such work. By a cooperative arrangement among growers, notice of impending storms is relayed among the growers at critical times so that spraying may be finished before the storm arrives. This plan is described in detail in Bulletin 106 of the New York State Department of Farms and Markets.

3. It is one thing to know when to make an application of spray material and an entirely different thing to apply it. A modern spraying outfit is a moderately complicated bit of machinery. It requires care and attention and this should be given before the critical time for spraying arrives. There is no time on spraying days, to adjust carburetors, pack pumps, mend hose or scrape scale out of



AT ONE OF THE SUMMER MEETINGS WHERE DEMONSTRATIONS WERE CONDUCTED. SEEING IS UNDERSTANDING AND REMEMBERING.

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nozzles. Every minute must be used in applying the protective coating to fruit and foliage.

4. It is perfectly obvious that time consumed in filling spray tanks is lost time so far as the trees are concerned. And yet it is not at all uncommon to find orchardists whose arrangements are such that it requires as long to fill the tank as it does to empty it. Men who have large acreage and limited time meet this difficulty in various ways. An elevated storage tank for water is provided, spray materials are weighed out in advance and are on the platform ready to dump into the spray tank, the outlet from the storage tank is very large, 6 inches, when the spray tank is empty the team is run to the filling station and each man has a definite piece of work to perform. In this way it is possible to fill a 200-gallon tank and be away in seven minutes.

5. The greatest time killer of all is the old, small capacity, mist spray nozzle. The inability of growers to cover their orchards at critical times because of all these hindrances to rapid work led to experiments in substituting dust for spray. When the outcome of dust experiments gave indications of success the manufacturers of sprayers set about it to improve their machines and nozzles to meet the new situation. High pressure pumps and spray guns have altered the situation very materially and the program of orchard spraying commonly advised can now be carried through, whereas formerly it could not.

The spray gun has done much to improve the quality of work done in the orchard spraying. It does not work well without high pressure; and high pressure cannot be maintained without keeping the whole spraying outfit in first-class working condition. Complaints have been made about the spray-gun but in most cases trouble has come because the operator had not become adjusted to a new order of things. In the old scheme, strength to hold the long poles was the important item, while in the new plan agility is all important. A nozzle that is delivering ten gallons of liquid in a minute must be moved about rapidly if the materials are to be evenly distributed.

RECENT RESULTS IN ORCHARD FERTILIZATION.

J. K. SHAW, MASSACHUSETTS EXPERIMENT STATION.

It is not overstating the case to say that our ideas of orchard fertilization have been completely overturned during the last decade. Formerly we were told that orchards required large amount of potash and some phosphoric acid but we must beware of nitrogen as it would overstimulate the tree and cause excessive growth at the expense of fruit production. Now we have come to believe that benefits are to be expected from the application of nitrogen more often than from any other element while in many cases phosphoric acid and potash cause no appreciable response from the trees. Formerly orchardists were urged to fertilize liberally in the firm belief that profitable increases of the crop would follow. Now we find that in many cases the application of fertilizer even nitrogen, increases the crop too little to pay the cost of the fertilizer and in many cases no increase whatever follows the application of fertilizers. The earlier teachings were based largely on experience with annual field and garden crops and on the analyses of the chemist who found that the fruit contained large amounts of potash. This reversal of opinion has been brought about by orchard tests of various combinations of fertilizing elements. We have asked the tree what it needed and the tree has promptly, and without prejudice given us its answer. We must, however, examine the answer with care and not allow ourselves to go to the other extreme lest we rob the soil and starve the tree.

In discussing the question let us ask first: Does it pay to fertilize the orchard? And second: If fertilizers do pay, what kind of fertilizer is best? Before proceeding to consider these questions there are certain fundamental facts that should be clearly set forth.

First, the trees remove from the soil each year certain amounts of plant food. Some of this is stored in the new wood and some is carried away in the fruit. All this fertility is permanently removed from the orchard soil. Some goes into the annual crop of leaves and a part or all of this may return at once to the soil.

Second, the soil contains considerable amounts of plant food, some in a readily available form and more locked up in forms less readily available to the tree. In studying

certain orchard soils under investigation in West Virginia, I found that the total amount of nitrogen and phosphoric acid in the surface nine inches was enough to supply the tree for thirty years and that there was enough potash to last the tree three hundred years. Of course we could not expect that the tree could ever extract all this plant food but on the other hand the trees will secure food below this nine inch layer down to at least two or three feet. In the fertilizer discussion this afternoon let us not lose sight of these fundamental facts.

Turning now to our first question. Does it pay to fertilize an apple orchard? Let us consider first the cultivated orchard and see what is the effect of fertilizer on the trees and on the cover crop, for every cultivated orchard will have a crop of some kind growing in it, sown either by man or by nature. Long continued experiments carried on by the experiment stations in New York, Delaware, West Virginia and New Hampshire have given a pretty clear and definite answer to this question and their experimental results are supported it seems to me by practical experience in the commercial orchard. Newly planted trees may grow and come into bearing in fully as satisfactory fashion without the use of fertilizers as with them, provided the soil is naturally fertile. After a period of years when no fertilizers are added the trees suffer, the first symptom being poor color of the foliage and lessened growth of the trees. The length of time before these symptoms appear will vary with the natural fertility of the soil. On poor soil they may appear in five or ten years, while on very fertile soils satisfactory growth may be maintained for twice that length of time. For many reasons some sort of cover crop in the orchard is desirable and in general the more vegetable matter it supplies for plowing under the better. It is pretty clear that in an unfertilized orchard, signs of a lack of plant food appear in the cover crop sooner than in the trees, which leads to the statement that if the soil is able to produce a good cover crop for plowing under, the trees will in most cases be making a satisfactory growth. These records have been made with a newly planted orchard in mind. If, instead, we consider an old orchard it is simply a question of the previous treatment. If it has been fertilized in the past the appearance of symptoms of starvation is delayed while if little or no fertilizer has been applied it may be already past, or lie in the immediate future.

These remarks apply to the cultivated orchard. If the orchard is in sod we can say that the need of fertilizers is

greater than in cultivated orchards even if the grass is cut and left to lie, or is raked about the trees, or if additional mulching material is brought in, though in the last case the fertilizer requirements will be lower and less urgent than when no additional mulch is added. If the grass is removed from the orchard, a practice that in most cases is little short of disastrous, the need of fertilizers is likely to be imperative from the start of the orchard.

We may conclude then that sometimes fertilizers will be beneficial to the trees, and sometimes they will not. The question at once arises: How are we to tell if fertilizers will be beneficial? The only answer we can give is based largely on the growth of the trees. If they are making a poor growth, if the foliage is sparse, and of a poor color, and they are not producing satisfactory crops it is quite likely that fertilizers will be of benefit. This statement is made on the assumption that drainage is good and that the trees are not suffering materially from insects, diseases or winter injury. As to how much growth is to be regarded as satisfactory we may say that if the annual growth of the leading shoots in young trees is 15 to 30 inches or in old bearing trees is 6 to 12 inches there is no cause to complain of poor growth.

If it appears that an orchard is in need of fertilizers we may pass to our second question. What kind of fertilizer is it best to apply? Should we use nitrogen, phosphoric acid or potash in certain of their various forms, or in some combination of two or all three of them? What is the value of stable manure and lime, and of various other materials which may be available? Unfortunately clear and definite answers to all these questions cannot be given until further investigations have been made. Some have said that the orchard fertilizer problem is a local one and every orchardist must find out for himself what his particular needs are. This is of course a cloak of our ignorance and a challenge to the experiment station investigator to find out by thorough study the processes by which the tree obtains the plant food of the soil and converts it into the fruit, that rewards the efforts of the orchardist. The job is a big one but the time will come when it will be possible to prescribe the fertilizer needs of the orchard with considerable certainty without going through the laborious process of testing a variety of fertilizer combinations in each individual orchard.

To return to our problem; with regard to stable manure we can say that in orchards requiring fertilization, stable

manure will always give good results. Large amounts should not be used, probably not over half as much as one would use for most field crops, whether light annual dressings or somewhat heavier applications every two or three years is to be preferred does not appear from the evidence at hand. Probably it makes little difference. Heavy applications at intervals greater than three years would probably not be the best practice. Of course stable manure for the orchard is not generally abundant and the general farmer who has a considerable amount will probably prefer to use it on his field crops.

Passing now to lime, there is so far as I know no conclusive evidence that it is of any direct value to apple trees, though it may favor the growth of cover crops and in the case of leguminous crops its use may be imperative.

Most fruit growers who have need of additional fertilizer for the orchard must necessarily use some form of commercial fertilizer and we may now consider just what form will be most likely to give the best results. As stated at the outset nitrogen is generally the most needed element and it may be quite confidently asserted that when trees are not making the growth they should be a reasonable application of nitrogen will give the desired results, and far from ruining the fruit producing capacity of the orchard, will materially increase it. It is only excessive applications of nitrogen that stimulate a too vigorous growth at the expense of fruit production. Nitrogen increases yields by promoting growth of the tree thus giving more area for fruit production, second, by giving larger apples and third, it is likely to cause a better set of the fruit. As to the form of nitrogen to be used, nitrate of soda is often preferred but sulphate of ammonia may be equally good. As to the value of organic forms there is too little evidence to warrant conclusions one way or another. The amount of nitrate of soda or its equivalent to be used will vary with conditions. With mature bearing trees in cultivated orchards, making a poor growth from 5 to 10 pounds will be about the right amount and very large trees will give profitable response to larger amounts. If one will follow the soil robbing practice of cutting the hay in a sod orchard, restitution must be made by materially increasing the dose even to double these amounts. Young trees will require less.

When applied in liberal amounts nitrogen will tend to give poorly colored fruit by delaying maturity and by interfering with sunlight though promoting a vigorous growth of the tree. If the weather is favorable the fruit may be

allowed to hang longer and possibly a moderate pruning in late mid-summer may let in the sunlight to color up the fruit. Summer pruning is often injurious and should be undertaken with care.

There seems to be no evidence that the application of phosphoric acid alone is often of any benefit to the trees though it may promote the growth of the cover crop and may especially favor the legumes. When used with nitrogen it may be helpful but the general trend of our present knowledge is that phosphoric acid is the least important of the three elements of plant food by which the value of a fertilizer is measured.

As to the carrier of phosphoric acid, some practical growers have earnestly advocated the use of basic slag but dependable experimental evidence to support this contention is rather meagre. Slag is out of the market now and while if it is to be preferred to acid phosphate unless it may be used to promote the growth of leguminous cover crops. The main question is the form in which a pound of phosphoric acid may be bought the cheapest.

Potash applied alone has in a few cases seemed to cause profitable responses from the trees but in many other cases little or no difference is brought about by its use. Evidently the apple tree can draw upon the reserve supply of potash in the soil. No means of telling whether trees need potash can be given. At present we can only advise trying it out and see if worth while results, follow. As to the best form of potash to use there is a little evidence that sulfate is to be preferred to muriate but it is not conclusive enough to warrant any definite recommendations. It should be added that potash often favors the growth of the cover crop especially clover and perhaps other legumes.

We may conclude from this discussion that in many cases cultivated orchards do not give profitable responses to fertilizer applications. Of course plant food is being removed from the soil and unless fertilizer is used the total reserve supply must be reduced for natural means of replenishment cannot be adequate. Still one could hardly advise the use of fertilizers unless profitable returns within a very few years are to be expected. When fertilizers are needed the profits of increased crops are often very great. In such cases the need for fertilizers is usually plainly indicated by poor growth and unthrifty foliage color of the trees. Nitrate of soda is generally to be advised in such cases, possibly with phosphoric acid or potash or both, especially if the growth of a cover needs encouragement.

If grass is grown in the orchard heavier applications of fertilizer will be needed and if one will remove the grass the restoration of fertility must be adequate. Old orchards in sod making a poor growth will usually be sufficiently stimulated for several years at least by partial or complete cultivation. Light sandy or gravelly soils will require more fertilizer than heavy soils and on such soils cultivation is the only system of orchard management to be recommended. Before investing heavily in fertilizers one should see that his system of soil management is sound and also that his pruning and spraying practice is good. When all these are on a satisfactory basis it is time to consider if fertilizers are needed. If so, nitrogen is most certain of any element of fertility to give good results and when this is supplied we may ask if potash and phosphoric acid are needed.

The most important element of success or failure in any case is the man behind the orchard. It will always be impossible to lay down a single plan of operations that will fit all conditions. No part of the program of orchard management calls for wider knowledge and sounder judgment than determining how much money shall be spent for fertilizers and what shall be bought with it.

EMPLOYMENT OF WOMEN IN HORTICULTURE.

GEO. D. AIKEN, PUTNEY, VT.

By inheritance and by inclination every woman is a horticulturist. It was Eve who was first attracted by the beauty and possibilities of the apple, and although the results of her first investigation in horticulture were disastrous to "the man," yet it seems that we must give woman the credit for beginning one of the most useful and best of occupations of mankind.

Horticulture, as I will use the word in this talk means the propagation, cultivation, harvesting, marketing, and appreciating of fruits, vegetables, trees, shrubs, and flowers. You will pardon me if at times I seem to have the nurseryman's viewpoint to an unusual degree, but it is in this field that I believe women and girls can work to the best advantage.

Inasmuch as nearly every woman is a horticulturist by inclination is shown by the fact that on nearly every farm it is the woman who attends to the ordering, planting and

caring for the plants and trees of the home garden. In every village it is the woman who plants and trains the crimson rambler by the door, or the hydrangea on the lawn. In every city it is the woman who cherishes the cyclamen, narcissus or other plants which give the natural tone to an artificial home atmosphere. In fact, it is in commercial horticulture alone that man surpasses woman.

The purpose of this talk tonight is to give you an idea of what women and girls have done and can do in the way of commercial horticulture.

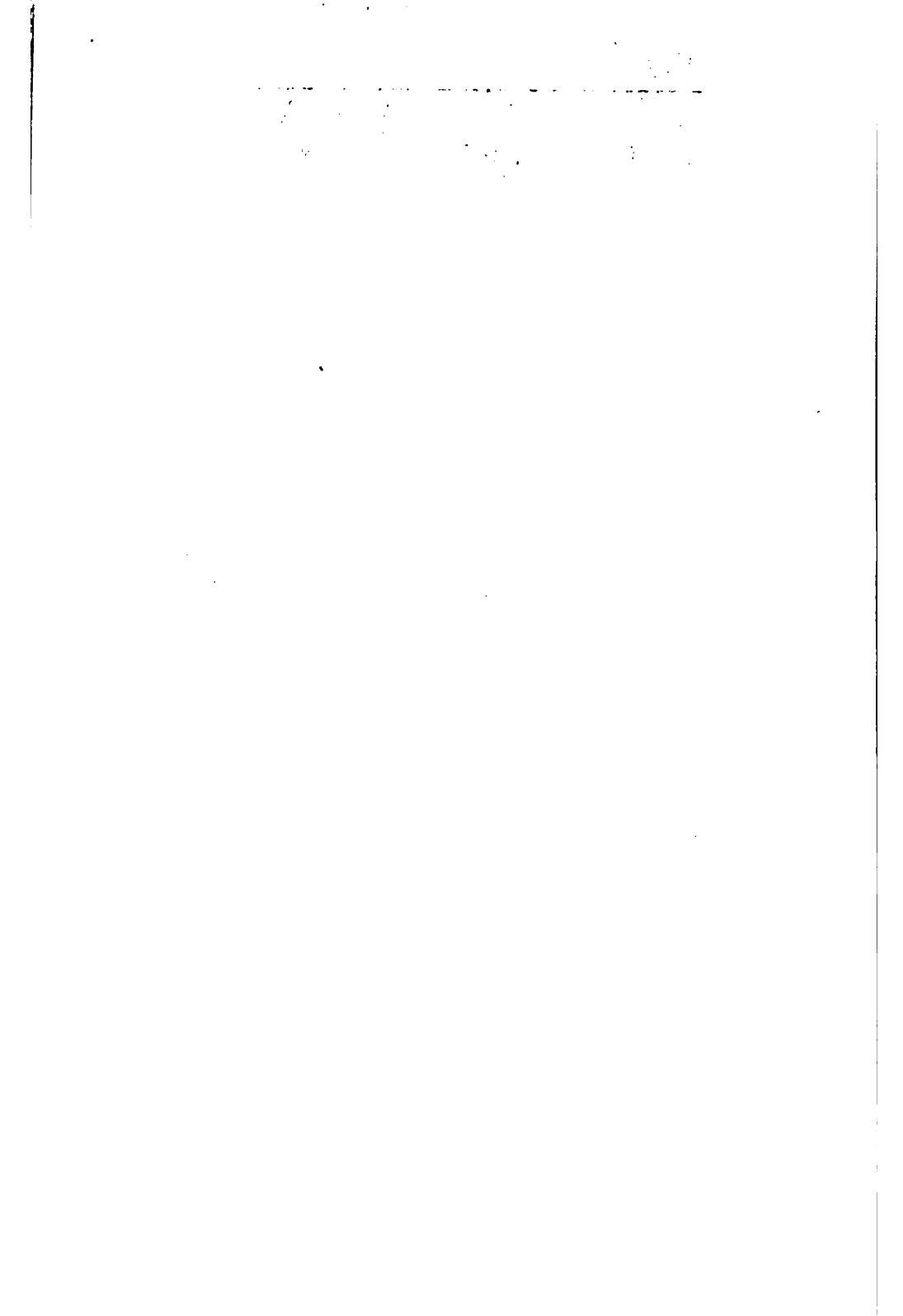
The most notable instances of the employment of women in horticulture is found among the fruit packers of the Pacific Coast, and the berry pickers of New York and other states. To a great extent women are employed in the harvesting of many crops like hops, onions, and tobacco. This work of harvesting, however, is only a temporary occupation, and cannot be taken as a gage by which to measure the value of women to commercial horticulture. For several years I have employed a considerable number of girls on my place, and I will tell you about the work they have done for me.

Since 1914 I have employed women and girls at berry picking time and have told the members of this Society about their work as berry pickers many times before. It is only since 1918 that I have used this sort of labor for my other work. About the last of July that year, I was called to the telephone and a girl's voice at the other end of the line said, "Mr. Aiken, do you need any more help?" Did I need any help! With a crop of raspberries likely to spoil on the bushes and no pickers to be had, it seemed as if St. Peter was on the wire offering to send some pickers down. The unit of "Farmerettes" on a large farm a few miles south of us was getting through, and in truth were "all dressed up in their khaki uniforms, and no where to go." I had not much faith in the value of girls as general farm workers, but I desperately needed some berry pickers, and so I said that six of them might come for two weeks.

Well, they came. At twenty-five cents per hour, the cost of picking berries was about the same as I was paying by the quart. At times the berries could not be picked and I would ask them to pull weeds or hoe some crop. They seemed to do this just as fast and well as the men, so when the berries were gone, I said that four of them might stay until college commenced in the fall. They did their work very well. That season I used them mostly for weeding, hoeing, cutting out old berry canes, and cutting brush.



WHAT SOME WOMEN DO IN HORTICULTURAL WORK, AND HOW THEY MAY LIVE;—
IN TENTS, OR IN THE OPEN DURING THE SUMMER MONTHS. READ THE STORY
OF WOMEN IN HORTICULTURE.



Their work being satisfactory, I asked them to return for the next summer vacation. Three of the four returned, bringing one new girl with them.

This second year they were of more value to me than they had been for the first season. Besides doing all the work previously mentioned; they potted strawberry plants, at which they were particularly adept, and laid down the tops of the black and purple raspberries for propagating. This season they proved especially valuable in canning our surplus berries and vegetables. During both the seasons of 1918 and 1919, I found the great disadvantage of hiring these college girls to be in the fact that I could not have them during the spring when I needed help badly, and also because they could not be considered as permanent help, practically all of them intending to take up other work after graduation.

While most of the girls who have helped me summers have been college girls, there is no reason why any woman or girl who likes this work and will put her heart in it should not succeed. The reason why college girls are successful is that most of them are working their way, and a girl with grit enough to work her way in college will make good most anywhere. One must necessarily look out for the girls who are romantic enough to think they want to be farmerettes. A day or two at pulling weeds in a temperature of 95 degrees will usually take the romance out of farmeretting; but it is best to avoid getting such girls if possible.

All of the girls who work for us during the summer are paid by the hour, for the actual time they work. On an average they put in 48 hours per week. We supply them with tents, beds, and necessary cooking utensils. They board themselves. While they are most likely to work from eight till twelve and one-thirty to five-thirty, yet on some days they commence at five, and sometimes work until dark, depending on the nature of the work to be done.

While on such work as weeding, and setting plants, a girl will do as well or better than a man, one must not expect her to do all that a man could do. It would be neither right nor profitable to ask her to hold a plow or pick stones. I do not believe she should drive a tractor except on the cover page of a magazine. There is work for women and work for men on a fruit farm, and it will be most profitable to have them both.

The great disadvantage in hiring girls is in not being able to get them at times when we most need them. There is another side to this, and we cannot expect to hire women

and girls to help us during the open months if we leave them without work for the winter.

The nurseryman has a better opportunity to employ girls throughout the year than the ordinary fruit grower, and a great many are engaged in nursery work. They have made good especially in landscape and garden work. In our own nursery, most of the grading and tying of plants is done by girls. They can pack small orders and assist with the additional office work that comes during the winter.

Just what the fruit grower could plan for winter work I do not know. Perhaps some of our large Vermont orchardists will manufacture by-products during the winter, or have grading and packing of fruit to do. At any rate the problems in hiring girls are to get them when needed and to provide steady employment. For berry growers the high school and college girls are ideal help, as they can be secured at just the time needed. For the apple grower the situation is different.

I believe that most of the girls who are engaged in farm work find it agreeable; they have many forms of amusement and seem to enjoy life. However, they have some problems. They do not like to be regarded as a joke; they are subject sometimes to the curious gaze or the impolite remarks of tourist, and these things are unpleasant. They are engaged in a most healthful and useful occupation, which almost invariably proves advantageous to them and their employers. They helped us during the war when so many, many men laid down on the job. My work has very largely been done by girls this year, and will continue to be, as long as it is such work as they can do. I hope to have permanent work for more of them soon. The farmerette, if you care to call her that, has made good.

EMPLOYMENT OF WOMEN IN HORTICULTURE.

ALICE M. HOLWAY, PUTNEY.

I have been asked, as a woman worker in horticulture, to tell my side of the story. For three years I have had an opportunity to take part in three important divisions of women workers. First, as a farmerette in a unit; second as a woman worker on a farm; and lastly as a horticulturist, making of this, a permanent life work.

My term as a farmerette lasted for three short and exciting months. Nine girls and myself, formed what was

known as the Naulahka Unit at Scott Farm in Brattleboro. This was in 1917, during the last year of the war. We objected seriously to the term farmerette. It seemed to insinuate frilled overalls and picturesque garden hats. However, we decided to change the meaning of the word, altho the name itself has always clung to us.

We lived in an attractive cottage on the estate, and were altogether under the supervision of an elderly woman horticulturist. She was our house mother as well as our field boss,—that is, she conveyed orders to us from the superintendent, personally supervising all our work. She did our cooking and was overseer of our attempts at housework during our off-hours.

The work of the unit was extremely variable. We were broken in on a leaf-raking job. From this we went to spading apple trees. This work of spading the sod around the fruit trees kept us busy for the greater part of the remainder of our stay at Scott Farm. We helped with the haying for several weeks, and can truthfully say that we enjoyed this work, strenuous tho' it was. One of us usually drove the team, another a horse rake. The rest pitched on. There was always a delegation in the barn mowing away. There were always several experienced men with us in this work. We also were taught very carefully, how to mow with a scythe. On Saturdays, two of our number were sent up to the estate with strict orders to wear only the regulation uniform. On this day the drives were scratched, lawns were mowed and all sorts of brushing and combing were performed. We had a large henhouse, too, with several hundred hens to care for, feed and water.

Our unit left Scott Farm the last of July. Six of the girls went to Putney to work for Mr. Aiken in berry fields. I went home to Massachusetts, leaving all semblances of unit life and action and worked for the remainder of the summer for a market gardener who lived only two miles from my own home. So, for a short time, I became acquainted with another division of women workers, those who work on their own farms with their own people. The man himself, was a hustler of the first order, and entirely used to women workers on the farm, altho his experience had been up to that time entirely personal, for his four daughters, undistinguished by either the term farmerettes, or by a unit, worked steadily for him from dawn until dark and often after dark as well. These four "Women in Horticulture" may truthfully be said to have helped win the war, although the youngest was not yet ten years of age. I liked

this work. Every hour was spent in doing something essential weeding, topping, and pulling vegetables, picking berries and picking beans, every moment was put to some use, and the feeling that the work was necessary helped over the hard places better than anything else could possibly have done.

The following spring I entered the third division of women workers to take up my life work among flowers and shrubs. I took a position as assistant to the teacher of horticulture in a school of landscape architecture for women. The woman with whom I was associated has always seemed to me to be a splendid example of what a woman may do in horticulture. Besides occupying an important position as instructor in horticulture, she managed a greenhouse and perennial nursery, doing almost all the work herself.

Although the main object of the students in this school was to learn the planning and executing of gardens, they were taught, also, the finer points of horticulture. They pruned the apple orchard, pruned and scraped the grape vines, did root grafting in winter and ordinary grafting in the spring. They studied and practiced raising plants from seed, from root cuttings, and green cuttings, as well as plant division—in short all forms of plant propagation. They often helped in packing the perennials for shipment. They regarded this as very valuable experience in identifying plants.

In the meantime the farmerettes of Scott Farm had been making a better meaning for the term "Farmerettes." In August I came to Putney to visit some of my unit who had come back for their second summer in Putney. They were trying a new scheme of things which they had been working out since I left them the previous summer. I had a chance to see what is, in my experience the ideal way to conduct a unit. The girls were living in shacks, and cooking their own meals. They slept in tents, planned their own meals and bought their groceries out of a common fund. Living in this way, and planning according to their knowledge of cooking, they lived for \$2 a week per person.

The girls were doing interesting work. It appealed to me as being ideal work for women—potting strawberries, tipping raspberries, cutting out old canes from raspberries and blackberries. They had picked berries as a fairly steady occupation all summer. Hoeing and weeding was an important factor, and during a lull they had helped the neighbors with the haying.

They were very enthusiastic about the life. I spent four days with them, and during that time, we went on two corn roasts, and on a canoeing party, ending the trip with a campfire and toasted marshmallows, and story telling. So there is no need for girls who do farm work to find nothing to do in the off hours. An enjoyment of outdoor pleasures and each other is enough to fill a summer full of the very happiest kind of times. A dollar will buy enough hot dogs and marshmallows.

The following spring I moved to Putney, myself, to help take care of Mr. Aiken's perennials and shrubs. This summer I had a chance to test the life to the last degree, as I lived in the shacks with the girls. One of them was back for her third summer, another for her second and another was here for the first time. As proof that we enjoyed it, we lived outdoors until the first of November.

In closing this brief history of my personal experiences with farmeretting, I might venture a few comments. Women workers are not new things under the sun. When has there not been a time when at least a few women have not worked on the farm?

Give us your reasons why you do not want our work or stand up for us, but do not join the lessening crowd of people who pass us in their cars as we work—"tell Oscar to drive slowly, because they do want to watch the farm-ettes work—they are so interesting."

Then too, women appreciate being given necessary work, no matter what it is. They hate to have work made to order for them.

I have mentioned many kinds of work which I know women like to do and are capable of doing; work which I do not believe is too difficult for them. I have never known a girl to injure her health doing this sort of work, and many with whom I have talked have claimed that it meant better health and more strength, than they had ever known before.

EMPLOYMENT OF WOMEN IN HORTICULTURE.

**MISS ALIDA FAIRBANKS, UNIVERSITY OF VERMONT,
BURLINGTON.**

I feel that there really is a big opening for girls in horticulture. At first they took it up as a war measure, but now they do it because they like it. Those who did it then have spread the good word around that there is this work. I never did anything that made me feel better, physically, than when I was working outside. When anyone asked me what I was going to do in the summer, and I told them I was going to farm it, they looked at me as though they thought I might know what I wanted to do, but doubted it. The first week I was lame, but after the first week I did not mind the work and enjoyed every bit of it. When I came home they did not doubt any more but what girls were able to do the work.

Mrs. A. C. Dimock, of East Corinth, said they had found that the slighter type of girl was better able to stand the work than the stronger, more robust type. She liked the girls she had at her place so well that she has taken them to Florida to help pick and pack citrus fruit. She said that for this kind of work their movements seemed to be quicker and their fingers more nimble.

The work that I did was along the small fruit line. I was on Mr. George Aiken's farm, in Putney, and when I first went there it was just after the strawberry season, so our work was hoeing beans and corn. We also looked after the runners in the strawberry patches and picked peas. We found that six people could pick about twelve bushels in a forenoon. After this we began picking raspberries, and for the next three weeks picked every day. We alternated from one field to another so that there were always berries to pick. When the picking was good we averaged about 40 pints a day, when it was not so good we picked two pints in an hour.

There was a unit of University girls at Jay, near Lake Placid, and their work was supplying vegetables for the Lake Placid Club. The eight girls and four men took care of the vegetables in the garden and picked and prepared them to be sent up to the Club. There was a canning kitchen in connection with this unit where the girls helped. 5,000

quarts of fruit and vegetables were canned during the summer. Their garden consisted of 30 acres.

Part of the work they did this summer was to clear up another piece of land which had been used previously for gardening, and which will be used to enlarge the garden for next summer. Most of their work was pulling weeds where the weeds were sometimes above their heads, and the last part of the summer they spent most of the time in clearing the ground. Next year the unit there is to be doubled, and there will be 16 girls instead of eight. The Lake Placid unit lived in an abandoned farm house, and for furniture had benches and boxes, and an old stove to cook on.

We girls at Putney camped out all summer. We had two shanties. One was the canning kitchen, and this served as our kitchen, also our dining room. The other shanty served as our rest room,—we called it the “club-house”. We had two tents in which we slept. We boarded ourselves and had an oil stove also a fireless cooker with which to do our cooking. We did not mind boarding ourselves at all. Sometimes the neighboring animals were a little too friendly, and some mornings the butter was missing from the brook, which was our refrigerator.

Everyone is interested in wages, both the employer and the employe. For work of this kind girls received from twenty-five to thirty cents an hour. We averaged about eight hours a day. We arose at six o'clock and had an hour for breakfast. We went to work at seven, worked until twelve, took an hour and a half or two hours for dinner and started work at half-past one or at two and worked until half-past four or five, unless something special had to be finished, when we worked longer. This would average twelve dollars a week. Boarding ourselves, as we did, cost from two to two and a half a week, so we cleared about nine dollars a week. The rains nearly all came at night, and when it did rain during the day there was canning to do, so we did not lose much time.

I feel that this is the best work a girl can do. It was much pleasanter than a great many other things. After I had been at it one summer it “tasted just like more”, and I want to go again next summer.

THE ORCHARD MEETING

AT CASTLETON, AUGUST 18, 1920. BY THE SECRETARY.

The ninth annual orchard meeting of the Vermont Horticultural Society was held at the 12,000 tree orchard of R. R. MacRae at Castleton. This orchard is the largest one of a single setting in Vermont, although there are some places where the acreage is greater, though not all set at one time, nor in adjacent rows. The MacRae orchard was set in 1912, is composed largely of McIntosh, with a sprinkling of Wolf River, Northwestern, Greenings and Wealthy. The Orchard is on rolling land, with some rows nearly a half mile in length, and straight as a string. The uniformity in size and shape of trees is remarkable.

The soil is a gravelly loam and is in sod, although for a few years clean cultivation was the rule. However, some portions of the orchard have always been in grass with hay never removed. Soil fertilization is with nitrate of soda, about two pounds per tree per year being used. The trees are in excellent condition; the foliage is fine. Many of the trees are bearing well this year. The orchard covers about 200 acres, is valued at \$200,000 and soon will be yielding an income of \$50,000 barring accidents.

The meeting was well attended. People came in auto parties from nearly all parts of the state. They were immensely interested in the orchard and its development, and in every phase of the program. It took three hours to look over the plantings and learn of the care the orchard had received. A speaking program followed the basket lunch, and good attention was given the lecturers.

Geo. A. Drew, of Greenwich, Conn., gave the chief address of the day, his subject being orcharding in Connecticut. He told the story of the 25,000 tree orchard at Conyers Farm at Greenwich. He spoke of varieties, nursery stock, setting out trees, care, harvesting, thinning, spraying, etc.

Exhibitions in general and the New England Fruit Show in particular were emphasized by H. C. C. Miles, of Milford, Conn. He made it clear that Fruit Shows are beacon lights to the fruit grower, and important events in the development of the fruit industry.

Prof. A. T. Stevens of Storrs, Conn., Wm. A. Munson, of Walpole, Mass., and Mr. A. Hackett, of Bolton, Mass., gave brief addresses.

There were many instructive demonstrations; the dust sprayer by W. S. Droman of the Niagara Manufacturing Company, at Middleport, New York; spray gun and tractor draft by R. R. MacRae; apple grading and sizing machine of Frost Insecticide Company, of Arlington, Mass.; pruning by J. M. Stevens, of Orwell; grafting by J. W. Collins, of Westminster. President C. L. Witherell of Middlebury, of the Vermont Society and Professor M. B. Cummings, of Burlington, Secretary, were instrumental in getting funds for the fall shows, and in increasing the membership. The days of demonstration is here. The day of commercial orcharding has dawned in Vermont and big things have come.

"ORCHARDING IN CONNECTICUT."

GEORGE A. DREW, GREENWICH, CONN.

Some years ago I spent considerable time in the apple regions of the Pacific Northwest to study conditions there. In an address I gave to the Connecticut Pomological Society on my return, I admitted that they had the following factors in their favor:—

1. Generally higher colored fruit on account of more sunshine.
2. Sometimes larger fruit on account of being able to control the water content in their soil by irrigation.
3. Earlier bearing trees.
4. More careful methods of growing and handling and inspecting the crop.
5. Better organization and co-operation between growers.
6. More faith in the business and a better spirit to convince themselves, as well as others, that theirs was the greatest business on earth.

To offset these advantages:—

1. We had much cheaper land.
2. We were nearer the large markets with good transportation facilities.
3. We could grow apples without paying a tax for water privileges.
4. We could grow better quality fruit.

5. While their trees might bear a little earlier, ours were longer lived.

When we realize our opportunities, and overcome our disadvantages, which are chiefly in cooperation and have more faith in our business, I firmly believe the Pacific Coast apple grower will either have to go out of business or seek other markets.

Each location has its peculiar advantages and disadvantages, and Conyers Farm is no exception. Even in Connecticut, conditions differ widely, and a spray schedule that might suit me, could not safely be followed by others. Some believe in sod orchards: others in cultivation and cover crops; but more perhaps in a modification of each method or both.

I shall not attempt to tell you how to grow apples in Vermont. That would be presumptuous on my part. Your own splendid up-to-date fruit growers and Experiment Station experts are the safest for you to follow. But I am glad of the opportunity of meeting brother fruit growers in Vermont, of comparing notes, and talking over our problems—frankly, I expect to get much more out of the deal than will you.

In planting out extensive orchards for others and smaller ones for myself, I must confess at the start that I have made mistakes and errors that I should not have made. Even after over twenty years of experience I find I still make some; but not the same kind. Yet I suppose most orchardists have been through similar experience. How many of you who have built homes who would not plan differently were you to build again? It is the same in planting out orchards. You will have to plant out a great many to get the ideal one.

Greenwich, on the Long Island Sound shore, the last town on the New Haven Railroad in New England is about 30 miles from New York City. It is more noted as a community of country homes than for its orcharding enterprises. Conyers Farm covers about 1,600 acres, of which over 300 acres are in New York State just across the line. Over 350 acres are planted out to fruit, 650 acres to farm crops, the balance is in pasture and woodland. At the start I was only allowed to plant out land too poor and stony for other farm crops, but now I plant out the best. There were several old, neglected orchards on the farm going to decay and considered fit only for the brush heap. These have been pruned up and renovated and put in first class condition; they now yield the best of fruit. Our smoother

orchard lands are cultivated with tractors for power; horses for the rougher places.

Besides apples, we grow peaches, pears, plums, grapes and small fruits, and have approximately 7,500 apple trees, old and young; 9,000 pears, 13,000 peaches, 1,000 plums, and cherries; with the balance in grapes and small fruits. In this talk I shall confine myself principally to apples.

In setting out apple orchards, I have found it well to start out with a definite plan, take time to study location, markets, varieties, and distance to set the trees. Too many hasten to set out orchards without any knowledge of the business, or regard for the location, or what they want to accomplish. Plant out as much or as little each year as you may desire or can afford, but always picture to yourself the ultimate orchard. If you give due consideration to this point, it will save you much worry, time, and money later on, in correcting mistakes.

VARIETIES:—The proper selection of varieties is of the utmost importance. As a rule it pays to stick to the standard sorts—those that have stood the best of time. Once in a great while a McIntosh or a Delicious comes to the front and crowds out the older sorts, but these instances are comparatively few. For the inexperienced, the nearest local up-to-date fruit grower or experimental station worker is a much better guide to follow than any nurseryman or out of state fruit grower.

It is always a debatable question as to how many or how few varieties to plant. This depends on the development you wish to make, the markets and transportation facilities. I think I am safe in saying that most fruit growers set out too many, rather than too few, varieties. It is something I am very prone to do myself. Study each variety to know how to grow and handle it, and anyone who has been through the confusion of a packing shed where more than one variety was being handled at a time will bear me out. If you plant an extensive list of varieties, select the one best variety for each particular season, and extend the season. Where you are catering to a special trade or nearby market, a more extended list of varieties is permissible.

NURSERY STOCK.—What fruit grower is there who has not had his troubles and disappointments in this respect? I have had mine. It takes great patience and faith in the orchard business to plant out trees, and wait years for returns under the best of conditions; but when varieties

you have planted turn out to be some worthless sort, your faith is often shaken.

You cannot be too careful in the stock you select. First you can exercise due care in picking out a reliable nurseryman. The best nurserymen mean to be honest, but there is a great difference in how they handle their business. You can buy apple seedlings and propagate your own trees. Few have the knowledge or time to do this, and generally only the experienced orchardist dares to propagate his trees.

You can buy one or two year old trees, set them in a nursery row, and "top-work" to the varieties you desire. Certain varieties like King, Gravenstein and the like do better top worked on some hardy stock like Tolman Sweet, and this is a very good way, if you have the time and patience to go to all this trouble and expense. I have had the best success in budding one or two year old trees, putting in at least two buds on the trunk, and later cutting out one. If one bud is left to develop the head, you will have less trouble with breakage.

You can go to a reliable nurseryman, take your own buds from your own selected trees, and have him propagate your trees for you. I commend this method to those who can plan their requirements ahead, and are willing to take this extra trouble.

SETTING AND CARE.—In planting our orchards, I have used both one and two year old trees and have had excellent success in both cases. The great advantage of the one year old tree is that it has more fibrous roots and starts to grow quicker under unfavorable conditions. Also the tree can be more easily formed.

On the other hand, two year old vigorous trees, where the roots have not been much mutilated and are given good care from the start, have the tendency to fruit one year earlier. In some cases we have cut back the tops to balance the roots; in other cases we set out the two year old trees without any heading back,—simply cutting out any surplus or poorly formed branches. The great advantage in this method is that the head is already formed and starts to grow from the terminal buds without forming a great mass of new branches that will soon require thinning. If the top is left as it is, only a very little pruning will be required until the tree comes to bearing age. An occasional cutting out of any crossed or forked branch to correct the head is all that will be necessary. If the first two seasons were favorable ones and the trees have special care, one gets remarkable results by this method.

The distance apart to set the trees varies with soil and varieties. Most people set their trees too close. While a Duchess or a Wealthy may not require more than 30 feet, a Baldwin or a Spy on strong soil needs, eventually, from 45 to 50 feet.

Shall we set a solid block of one variety, interplant an early bearing variety with a standard, or simply set standard trees and intercrop them with corn, potatoes, etc., until the trees are ready to bear. Each method has its advantages and disadvantages, and a great deal depends on the fruit grower and his location.

If we set a solid block, we have the advantage of economical handling, but must be very careful not to have these solid blocks of one variety too large or the blossoms will not pollinize in an unfavorable season.

If we interplant an early bearing variety with a standard, like Duchess and Baldwin, 20 to 25 feet apart, we make economical use of the ground and can reasonably expect a crop of Duchess in from 5 to 7 years. When the Baldwins are ready to bear in from 10 to 12 years, the Duchess can be removed and you have an orchard of Baldwins grown for you practically free of cost. The great objection to this method is that some people will not cut out the fillers at the proper time, always wanting to get one more crop, to the detriment of the permanent trees. This is not an objection to the system, but to the orchardist, if he fails to do what he should do.

If you set standard trees and intercrop, as many fruit growers in Western New York do, with beans and forage crops, you can get a money crop at once from the orchard, and this is a distinct advantage, but it has its complications on account of spraying, care, etc. I have used each of these three methods to advantage.

I have set solid blocks of Duchess and Wealthy as close as 15 x 20 feet, and have had profitable crops in 5 years from planting; McIntosh in 6 and 7 years. In an orchard set in 1907, we started two years ago to prune up the fillers to let the permanents have more space; this year we took out all the filler trees that were not fruiting, while this fall we will cut out every filler as soon as the crop is off. The amount of fruit we have taken off an acre by this method has been remarkable, but it is a dangerous one unless you follow it up closely. I am a great believer in growing the trees vigorously from the start. Do not allow the trees to get stunted.

Where stable manure is available, there is nothing better. Chemical fertilizers, high in nitrogen content, are a good substitute. Legume cover crops, as clover, vetch, soy beans, etc., are excellent to grow and plow under during the early life of the orchard to build up the humus content of the soil. On poor soil, rye and vetch, or even buckwheat can be used to advantage. Stop cultivation early so as to let the trees harden for winter.

As soon as the orchard is ready to fruit, I would radically change my method of handling. Where I practiced cultivation, I would be extremely careful not to do it to excess, starting as early in the spring as possible and stopping early in the summer so as not to get an excessively tender growth; and allowing the fruit to color. I would use nitrogen from whatever source with extreme care, and apply more phosphoric acid, and possibly potash, if it were available at reasonable prices. Occasionally I would seed down the orchard to sod.

MICE INJURY:—You are all aware of the many dangers that beset the young trees from planting to fruiting, mice injury has been one of our great problems. I have tried mounding up the trees with soil against the trunks late in the fall. I have used paper wrapped around the trunks. But galvanized wire guards, $\frac{3}{8}$ inch mesh, 15 to 18 inches wide, cut in 10-12 or 15 inch strips, according to the size of the tree trunk, has been the most economical and dependable method of prevention, in spite of its initial high cost.

SPRAYING:—The necessity of spraying is no longer open to question. In our locality near Long Island Sound, where we have much fog, we have to do a large amount of spraying, and, I judge, it costs us a great deal more than it does you. While we have a duster, our main dependence is on liquid sprays. Every year we give a dormant spray commercial lime and sulphur 1 to 9, followed, in the case of varieties like Baldwin, by a spray when the buds show pink, or lime and sulphur 1 to 40 and black leaf 40, 1 pint to 50 gallons water. With varieties like McIntosh which is very subject to scab, we use bordeaux in the pink stage $\frac{1}{2}$ strength, 2-4-50 with black leaf 40.

We spray again when the calyx falls with commercial lime and sulphur 1 to 150, with black leaf 40. If we use lime and sulphur stronger than this, we are liable under our conditions to do a great deal of burning of the foliage. In the subsequent sprays,—two or three according to season, we eliminate commercial lime and sulphur entirely for fear of foliage burning, and substitute self boiled lime and

sulphur 8-8-50, which, altho more expensive to make and handle, is nevertheless much safer.

THINNING THE FRUIT:—Anyone who is familiar with western methods knows that one reason why they grow such a large percentage of fancy fruit is because they eliminate the poor fruit early in the season.

When I first started, about 1906, to regularly thin our orchards, I was an object of ridicule. What! pick Baldwins in July from large trees? Who even heard of such foolishness! Yet, now most of the up-to-date orchardists have adopted this practice and recognize the necessity of it. Of course, young trees are easy to thin, while old trees are costly. It also requires rather skilled labor and careful supervision to do it carefully. Besides eliminating the poor fruit, it is a wonderful help to the tree in balancing the load, and has the tendency to force regular and annual crops.

HARVESTING AND MARKETING:—At Conyers Farm we start our apple harvest in early July with the Yellow Transparent. As we are near our market, this is an excellent variety for us. We pack in bushel hampers, eliminate as much extra handling as possible, and load on to auto trucks. A driver and salesman accompany the load. The latter sells to the marketmen direct for cash, and on his return turns in the records of sales to each purchaser. If we have an excessive amount above local requirements, we use the Bridgeport or New York City wholesale markets, about equally distant 35 miles away, doing our own transportation.

We follow the Yellow Transparent with Red Astrachan, Duchess, Williams Favorite, Wealthy which we pack in the standard bushel hamper. At the same time that we are handling our apples, we have our peach crop which starts in July and lasts until October 15th. Our pears and plums work into the general scheme.

We run a retail stand on the farm, where we sell direct to consumers, and this disposes of a great quantity of our peach, plum and pear crops, as well as a considerable amount of apples.

Following the Wealthy variety, which we market in September and October, is the McIntosh. We sometimes use the hamper, but more often the barrel. I have tried the western box, and believe there are possibilities in it for one who has the time and patience to work up a special trade and who is growing fancy fruit. The trade, however, looks on the standard box as a western package and it will take some years to overcome this prejudice. Generally speaking, I believe the barrel will be our winter apple pack-

age for some years to come and this is unfortunate at the present price of barrels.

We market the McIntosh from November 1st to January 1st; the King during December; the Rhode Island Greening with us is our best late fall and early winter cooking apple, but we have to dispose of it by early January or it will scald. You will see by this list that we plan on the McIntosh as our best eating apple from November to January while the Rhode Island Greening is our best cooking apple.

From the first of January, we call the Baldwin our culinary apple up to May, and the Northern Spy our best eating apple. You may be surprised that we try to grow Spys; we cannot grow as good ones as you do, but they work in so well with our scheme of varieties that we grow them as best we can.

During May and June we market our Newtown Pippins—a variety that originated on Long Island and which is still grown in considerable quantities in the lower Hudson Valley, some 30 miles away from Greenwich. You generally think of this variety as a Pacific Coast or Virginia product. For the last three years I have had receipts from apples every month in the year.

COLD STORAGE:—We operate a cold storage plant. Starting with the fall fruit, we pick in baskets and put in storage boxes holding enough to pack out about a bushel. We put these boxes of fruit ungraded, direct from the orchard into the storage and pack out on rainy days, or whenever we have the demand for the fruit. In the winter, packing out this fruit, with the pruning work, keeps our regular force busy, and we are able to carry a considerable number of skilled employees the year round.

REPORT FROM THE NEW ENGLAND FRUIT SHOW.

C. L. WITHERELL, CORNWALL, VT.

It seems to be my privilege to make a report of the New England Fruit Show held at Hartford, Conn., Nov. 5-9. This show is represented by each New England State through a vice president. It holds an annual meeting and show every season in some one of the New England States.

A year ago now this Horticultural Society voted to expend a sum not to exceed \$200 in order to place an exhibit at the 1920 New England Fruit Show. As I was vice president for Vermont, it was up to me to arrange for this exhibit. The first intention was to put up a 100 full box exhibit, but due to various difficulties that our growers had, like hail and wind storms and shortage of help, we were unable to secure 100 boxes of fruit, so we got together twenty-five boxes and placed ninety flats, or shallow boxes. This exhibit was of very fine quality. We had McIntosh, Winter Banana, Northern Spy, and some Delicious in flats, and a table in front of this exhibit filled with apples of various kinds placed in different ways. "The Orchards", of Bennington, had an artistic exhibit, in fact made the only artistic exhibit of any grower from this state, and I believe won second prize on this exhibit.

Some of the exhibits from other states were about as follows:—238 flats for Connecticut; 190 flats for New Hampshire; 100 flats for Massachusetts; 100 flats for Maine; 50 flats for Rhode Island; and 90 flats for Vermont.

For full boxes they offered a prize at this show, a 25-box, and I believe had three exhibits in this class. The first prize was won by New Hampshire with twenty-five boxes of Baldwins, which was the finest thing I have ever seen for apples.

There were several 10-box exhibits; a few 5-box; a strong class of singles, also a good showing of barrels. While the state exhibits were comprised principally of flats, which spread out over quite an area and made a very handsome showing.

I think we all went home feeling that this was really the best thing ever put up at a New England Show. For comparison we have at this show, 200 boxes besides flats and barrels, which would make about 275 boxes, and figur-

ing up these flats at the New England Show, four to the bushel, these totaled 350 bushel boxes, a difference of only 75 boxes. So you can see that Vermont is doing something along this line.

Vermont won her share of premiums although there were only three exhibitors in the premium classes.

REPORT OF SECRETARY!

M. B. CUMMINGS.

In his report the secretary called attention to the summer meeting which was held at the MacRae Orchard at Castleton, August 18th, a report of which is given elsewhere; to the beginnings of trades exhibits at our meetings; to the need of more funds for society work; to the increase in number of life members; to generous support of the Rutland Business Men's Association; to the help given by the Rutland papers; and to the hearty support and interest of members and friends.

For some time the secretary has been seeking information on the large orchards of the state. There is much yet to do, but when complete and supplemented with United States Census data, and with a brief of the historical development of orcharding in Vermont, it will be an instructive and inspiring paper of information on apple culture in Vermont. This report may be ready in 1921.

The new books listed below will make valuable additions to the library of any horticulturist:—

Injurious Insects by O'Kane, published by Macmillan Co., of 64 Fifth Ave., New York City.

The Nursery Manual by L. H. Bailey, published by Macmillan Co.

Productive Small Fruit Culture, by F. C. Sears, and published by Lippincott Co., of Independence Square, Philadelphia, Pa.

Strawberry Growing, by S. W. Fletcher, and published by Macmillan Co.

The Fruit Growers' Guide Book, by E. H. Favor, published by the Fruit Grower Co., St. Joseph, Mo.

Landscape Gardening, by O. C. Simons, published by Macmillan Co.

REPORT OF TREASURER.

W. C. COLTON, TREASURER.

SUMMARY.**RECEIPTS.**

State appropriation,	\$ 500.00
Dues,	176.00
Gifts for special premiums,	150.00
Advertising in program,	35.00
Interest on deposits,	12.31
Cash on hand Nov. 10, 1919,	401.08
	<hr/> \$1,274.39

EXPENDITURES.

Premiums,	\$ 169.50
Lecturer's expenses and fees,	121.56
Secretary's expenses, supplies and salary,	179.45
Printing,	116.99
Officers' travelling expenses,	96.52
Miscellaneous,	158.76
Cash on hand Nov. 8, 1920,	431.61
	<hr/> \$1,274.39

RECEIPTS IN DETAIL.

1919.	
Nov. 10	Cash on hand, \$ 401.08
12	Secretary, dues, 18.00
12	R. R. MacRae, special premium, 10.00
18	Secretary, dues, 18.00
18	E. H. West, special premium, 5.00
24	C. L. Witherell, special premium, 10.00
24	Geo. D. Aiken, special premium, 10.00
24	Rutland Business Men's Assoc., special premium, 30.00
24	Secretary, dues, 38.00
24	Gov. P. W. Clement, special premium, 50.00
Dec. 4	J. B. Wilbur, special premium, 15.00
4	Rutland Business Men's Association, 20.00

1920.		
Jan.	1	Interest on deposits, \$ 2.31
		State appropriation, 500.00
Feb.	10	Secretary, dues, 8.00
Mar.	31	Secretary, dues, 12.00
June	2	Secretary, dues, 17.00
	18	Secretary, dues, 18.00
July	1	Interest on deposits, 10.00
Aug.	16	Secretary, dues, 5.00
Sept.	1	Secretary, dues, 24.00
	4	Secretary, dues, 12.00
	18	Secretary, dues, 6.00
Oct.	27	Advertising fees, program, 35.00
		<hr/> \$1,274.39

EXPENDITURES.

1919.		
Nov.	26	E. H. West, Dorset, Vt., \$ 48.00
	26	A. O. Ferguson, Burlington, Vt., .50
	26	Grand Isle Orchard Co., Burlington, Vt., 4.50
	26	A. T. Clark, Vergennes, 3.50
	26	C. L. Witherell, Middlebury, 36.00
	26	R. R. MacRae, Castleton, Vt., 15.00
	26	The Orchards, Bennington, 25.50
	26	G. E. L. Badlam, Rutland, 1.00
	26	Mrs. A. B. McCormack, W. Rutland, 1.00
Dec.	8	M. B. Cummings, Burlington, 11.72
	8	C. R. Taylor, Boston, Mass., 17.00
	8	Prof. F. C. Sears, Amherst, Mass., 33.22
	8	W. C. Colton, Montpelier, Vt., 6.56
	8	Prof. F. A. Waugh, Amherst, Mass., 35.62
	8	Geo. D. Aiken, Putney, Vt., 12.76
	8	E. H. West, Dorset, Vt., 34.50
	8	Geo. W. Perry, Chester, Vt., 2.34
	16	Marion L. Chatterton, Burlington, 4.00
	16	D. T. Trombly, Isle LaMotte, 13.88
	16	Free Press Association, Burlington, 23.50
	*16	D. W. Edson, Montpelier, 4.61
	16	L. F. Brehmyer, Rutland, 1.50
	16	Hotel Berwick, Rutland, 69.30
	20	G. E. Badlam, Rutland, 1.82
	20	Susan A. Nott, Burlington, 59.54
	20	C. L. Witherell, Middlebury, 61.15
	24	M. B. Cummings, Burlington, 15.00
	24	M. C. Chatterton, Burlington, 2.00
	30	M. B. Cummings, Burlington, 50.00

1920.		
Jan. 15	Bertha A. Holden, Burlington,	\$ 5.47
Feb. 19	S. A. Rand, Burlington,	1.50
May 28	M. B. Cummings, Burlington,	54.58
	28 Capital City Press, Montpelier, Vt.,	2.25
	28 S. A. Rand, Burlington,	6.80
	28 Free Press Association, Burlington,	31.32
	28 M. B. Cummings, Burlington,	13.20
Sept. 7	M. B. Cummings, Burlington,	2.95
Aug. 16	S. A. Nott, Burlington,	1.83
	16 Free Press Association, Burlington,	9.00
Sept. 20	R. R. MacRae, Castleton,	16.05
	7 Edith Field, Burlington,	5.00
	7 Hotel Berwick, Rutland,	7.00
	20 George A. Drew, Greenwich, Conn.,	19.50
Oct. 25	Addressograph Co., Boston, Mass.,	5.50
	25 Free Press Association, Burlington, Vt.,	39.06
	25 M. B. Cummings, Burlington,	14.00
Nov. 2	C. L. Witherell, Middlebury,	5.75
	8 Cash on hand,	431.61
		<hr/>
		\$1,274.39

AUDITOR'S REPORT.

Vergennes, Vt., Nov. 15, 1920.

I have this day examined the report of the Treasurer of the Vermont State Horticultural Society, and find it to be correct.

A. T. CLARK,
Auditor.

AWARDS IN 1920.**APPLES ON PLATES.**

Variety.	Winner.	1st Prize.	2nd Prize.
Baldwin,	E. H. West, Dorset, The Orchards, Bennington,	\$1.00	\$.50
Bellflower,	Scott Farm, Brattleboro, Grand Isle Orchards, Grand Isle,	1.00	.50
Delicious,	A. O. Ferguson, Burlington, C. L. Witherell, Middlebury,	1.00	.50
Fallwater,	Grand Isle Orchard Co., Grand Isle,	1.00	
Fameuse,	E. H. West, Dorset, C. L. Witherell, Middlebury,	1.00	.50
Grimes Golden,	The Orchards, Bennington, R. R. MacRae, Castleton,	1.00	.50
Hubbardston,	The Orchards, Bennington, Dr. C. A. Gale, Rutland,	1.00	.50
Jonathan,	C. L. Witherell, Middlebury, Grand Isle Orchard Co., Grand Isle,	1.00	.50
King,	Grand Isle Orchard Co., Grand Isle, The Orchards, Bennington,	1.00	.50
McIntosh,	E. H. West, Dorset, Scott Farm, Brattleboro,	1.00	.50
Northern Spy,	R. R. MacRae, Castleton, E. H. West, Dorset,	1.00	.50
N. W. Greening,	E. H. West, Dorset, R. R. MacRae, Castleton,	1.00	.50
Roxbury Russett,	Grand Isle Orchard Co., Grand Isle,	1.00	
R. I. Greening,	A. T. Clark, Vergennes, Scott Farm, Brattleboro,	1.00	.50
Spitzenburg,	The Orchards, Bennington, Grand Isle Orchard Co., Grand Isle,	1.00	.50
Sutton,	The Orchards, Bennington,	1.00	
Tolman Sweet,	A. T. Clark, Vergennes, The Orchards, Bennington,	1.00	.50
Wagener,	The Orchards, Bennington, C. L. Witherell, Middlebury,	1.00	.50
Wealthy,	Scott Farm, Brattleboro, R. R. MacRae, Castleton,	1.00	.50
Westfield,	Grand Isle Orchard Co., Grand Isle,	1.00	
Wolf River,	E. H. West, Dorset, R. R. MacRae, Castleton,	1.00	.50
Winter Banana,	C. L. Witherell, Middlebury, A. T. Clark, Vergennes,	1.00	.50

BEST ARTISTIC DISPLAY.

	1st Prize.	2nd Prize.	3rd Prize.
R. R. MacRae, Castleton,	\$25.00	\$15.00	\$10.00
C. L. Witherell, Middlebury,		15.00	
E. H. West, Dorset,			10.00

SHALLOW BOX DISPLAY.

McIntosh,	E. H. West, Dorset,	3.00		
	C. L. Witherell, Middlebury,		2.00	
	R. R. MacRae, Castleton,			1.00
Northern Spy,	E. H. West, Dorset,	3.00		
	R. R. MacRae, Castleton,		2.00	
	C. L. Witherell, Middlebury,			1.00
Delicious,	C. L. Witherell, Middlebury,	3.00		
	Wm. J. Anderson, Shoreham,		2.00	
Wealthy,	R. R. MacRae, Castleton,	3.00		
	C. L. Witherell, Middlebury,		2.00	
	E. H. West, Dorset,			1.00

OTHER VARIETIES.

N. W. Greening,	R. R. MacRae, Castleton,	3.00		
	E. H. West, Dorset,		2.00	
Baldwin,	C. L. Witherell, Middlebury,		2.00	

BARREL EXHIBIT.

Fameuse,	E. H. West, Dorset,	8.00		
Northern Spy,	E. H. West, Dorset,	8.00		
R. I. Greening,	E. H. West, Dorset,	8.00		
	A. T. Clark, Vergennes,		5.00	
McIntosh,	R. R. MacRae, Castleton,	8.00		
N. W. Greening,	E. H. West, Dorset,		5.00	
Delicious,	Best barrel of Delicious by Stark Bros., Louisiana, Mo., \$50 worth of nursery stock to C. L. Witherell, Middlebury.			

BOX EXHIBIT.

McIntosh, (5 boxes), Scott Farm, Brattleboro,	15.00		
McIntosh, (5 boxes), C. L. Witherell, Middlebury,		10.00	
McIntosh, (5 boxes), W. J. Anderson, Shoreham,			5.00
Delicious, (10 boxes,)	C. L. Witherell, Middlebury,	25.00	
McIntosh, (10 boxes),	R. R. MacRae, Castleton,		15.00

BEST SINGLE BOX.

McIntosh,	R. R. MacRae, Castleton,	5.00		
	C. L. Witherell, Middlebury,		3.00	
	E. H. West, Dorset,			2.00
Northern Spy,	R. R. MacRae, Castleton,	5.00		
	C. L. Witherell, Middlebury,		3.00	
	E. H. West, Dorset,			2.00

ANY OTHER VARIETY.

Jonathan,	C. L. Witherell, Middlebury,	5.00		
Wealthy,	Scott Farm, Brattleboro,		3.00	
	R. R. MacRae, Castleton,			2.00

GENERAL DISPLAY.

R. R. MacRae, Castleton,	25.00	
C. L. Witherell, Middlebury,		15.00
E. H. West, Dorset,		10.00

FIFTY APPLE EXHIBIT.

McIntosh,	E. H. West, Dorset,	10.00	
Delicious,	C. L. Witherell, Middlebury,		15.00
McIntosh,	R. R. MacRae, Castleton,		3.00

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Twenty-eighth Annual Meeting

of the

VERMONT MAPLE SUGAR MAKERS' ASSOCIATION

In the Gymnasium

UNIVERSITY OF VERMONT

Burlington, Vt.

JANUARY 11, 12, 13, 1921



ST. ALBANS, VT.
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1921

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PROCEEDINGS
OF THE
TWENTY-EIGHTH ANNUAL MEETING
OF THE
Vermont Sugarmakers' Association

The Gymnasium, University of Vermont

BURLINGTON, VERMONT

January 11, 12, 13, 1921

The 28th Annual Meeting of the Vermont Sugarmakers' Association convened at 2 o'clock, January 11th.

INVOCATION.

REV. C. J. STAPLES, BURLINGTON, VERMONT.

Our God of the open sky and of the fruitful earth, for a moment we would realize something of Thy share in the works of our hands. Thine is the sunshine that pours upon the earth in the days of springtime; Thine are the showers that descend upon the waiting ground; Thine are the brooks that run among the hills, and the lakes that mirror the mountains—and in Thy name we would go forth to care for those whom Thou hast placed in our care; all sheep and oxen, yea and the beasts of the field, the fowls of the air,—In Thy name we would labor that we may bring forth that which is useful and that which is helpful into the life of our fellow-men. In Thy name we would succor those that are in want; in Thy name we would make this earth a bounteous harvest field for all mankind; and we would not be unmindful of the cry of Thy children that comes across the sea, the cry of those who are in misery and pain, the cry of those that are void indeed of education, of enlargement of mind, distant countries in distress and the midst of disease. Grant that we may be one together in our search for things high and pure and true, and so be faithful children of the trust which Thou hast placed within our keeping, and in the name and memory of Him Who went about doing good among the hills and valleys of far off Palestine, we in His spirit would minister to one another, and in ministering to one another show forth our gratitude to the giver of all good. Amen.

ADDRESS OF WELCOME.

JAMES E. TAYLOR, (In Absence of Mayor Jackson.)

Members of the Vermont Dairymen's Association and of the Vermont Maple Sugar Makers' Association:

Of course, from the very beginning of time men have felt that agricultural production was superlatively important and that of all civilization you were the real fellows, but they never had the fact "rubbed in" until the War; and now Vermont, of all states in the Union, realizes the fundamental importance of you and your work; and we of the cities feel that about all that the city is for is to exist in. I think the men of the cities are intensely interested in the objective you have before you, to make Vermont the very best cattle market in the United States; to see to it that from the point of yield and quality the Vermont cow is the cow of the United States, and that from all over the Union men come here to buy the best. I think city men feel they are helping you in that work; their legislative appropriations and their work along other lines are not merely for the sake of doing something for the country but they are doing something for the city as well, and carrying out Vermont's slogan "Quality superlative"—not so much quantity as is represented in many other states, but *quality*. But we must remember that we are not only a land flowing with milk but also a land flowing with maple sweets. We realize in the development of this product that we must see to it that every producer produces according to the best methods and we know that the manufacturer of the very best sweet obtains the very best price,—and that is a proposition that all are interested in.

The matter of advertising is of utmost importance, and should receive most careful and constant attention on the part of the producers, both of the sweet, and milk as well. We want to tell the world the truth about our Vermont products. We are mighty glad to greet you in Burlington, and we hope more and more you will be helped and help us by coming to our city for your meetings yearly. We want you to know you are right welcome at this time.

RESPONSE TO ADDRESS OF WELCOME.

C. F. PURINGTON, BURLINGTON.

It is with a great deal of satisfaction that I respond for the Association to the very gracious words of welcome that Mr. Taylor has given us. It is very evident that in the repeated visits of the Association to this city and the repeated welcomes that the City has given us, that there is a mutual helpfulness to all parties interested. We thank you very heartily for the accommodations which you arrange for us, and we trust that the Association in return may bring something of value to the City. We realize the seriousness of the reconstruction period through which we are now passing; the timid are in a panic over the conditions,—the retrenchment of trade and other conditions, and many are filled with feelings of distrust,—this condition at present is so serious that it is only those who have superior courage, those who have confidence in the country and its future that can go forward in the usual course of events. I wish to say that I have complete confidence that this country, this State, and this little section of ours, is going to pull out of this serious condition without any permanent disastrous results. I ask each of you to have superior courage, superior confidence that this great nation will come through this crisis safely; let each of us have a spirit of optimism in the splendid future of our Nation just at this critical moment. This is important for each of us, as important for the merchant as for the producer. That is the message I have for you today, in thanking the city officials and the officers of the University for all they are doing for us, in placing these facilities at our command.

President Badger addressed the members present in a cordial manner, expressing his desire that individually the members of the association should indicate their interest in the association by taking an active part in the meeting in the way of discussion and criticism. He covered the ground at length as to the cost of manufacture and told of his experience last year toward co-operating with different companies and states, to the end that a reasonable and proper price should be received by the maple sugar makers for their product.

He dwelt at some length upon the matter of adulteration and explained in detail how it operated. He covered the subject of the advertising and sale of the products of the maple orchard in a thorough manner, and prophesied a rosy future for sugar makers who were thoroughly honest in their manufacture and sale of the sweet.

SECRETARY'S REPORT.

Mr. President, Members of the Vermont Maple Sugar Makers' Association, Ladies and Gentlemen:

One year ago I was asked to serve you as your Secretary by members of your organization. I said "No." I was urged by some of the old members of this association to think it over and see if I could not see my way clear to act as Secretary. I finally promised I would consider it but did not believe it would do any good.

But after debating the matter for a few hours and sleeping over it I could come to but one conclusion, that an occupation engaged in by ten thousand producers, an occupation in which more than ten thousand families of Vermont found profit and pleasure bringing into the state a revenue the past year of six million dollars was worthy of the best thought, energy and time of any good Vermonter. Looking at it from that point of view I said that I would serve you.

The first thing that came to my attention was what are the possibilities of the work.

Immediately three lines of work presented themselves; any one of the three should have the entire time of a good man. First, Organization: With ten thousand producers and only one and one-fourth percent of them paying their membership dues for 1919 and less than five percent ever having joined the organization there certainly needs to be a large amount of organization work done. Second—Advertising: With the maple product bringing in a revenue of several million dollars each year without one cent spent for advertising and millions of people in the United States who have never seen or tasted pure Vermont Maple products. What are its possibilities when properly advertised? I leave this to your consideration and other speakers of the week. Third,—Marketing: From six hundred questionnaires sent out to producers through the State with three hundred forty-one returned, all but six of them specified that they wanted help in marketing, or that we feature marketing at this convention.

Upon the lines of Organization, Advertising and Marketing I have tried to do what I could for the sugar producers of Vermont. I believe that we have started the ball

of organization rolling and it will not stop until every producer is a member of the association and every pound of maple sugar and syrup is put up in a standard package stamped and sold as pure Vermont Maple Sugar and Syrup in every state of the Union.

And that it will be a crime to cut or destroy a sugar maple in Vermont that has not become stag-headed or past its usefulness as a sap producer.

I ask you, are we not putting too little value upon the beauty and value of the sugar maples?

We have encouraged the display of maple products throughout the State, we have cooperated with directors of the county and State fairs whereby they have increased their premiums for maple products.

Some have built buildings especially for maple products and some large and excellent exhibits have been the result.

In cooperation with the department of Agriculture we put on at the Eastern States Exposition at Springfield, Mass. what many told us was the largest and best display of maple products ever seen in New England. This was duplicated at Boston, Mass. in connection with the meeting of the National Grange. This we believe to be the most effective form of advertising, and should be extended to include Western and Southern States.

It is but a few years since the first creamery or milk shipping station was built in Vermont, a few years since the first dairy expert was employed by the State, but it has developed until we find dairy inspectors, cow testers, dairy specialists working in every town for the improvement of the dairy product of the State of Vermont.

The maple sugar producer of today is like the dairyman before the days of creameries and shipping stations and the assistance of expert knowledge.

First, let us see to it that we have a maple sugar specialist devoting his entire time and ability to improving and stimulating the maple sugar industry of Vermont. Second, that you build or buy cooperatively store houses at the large shipping points of maple sugar and syrup where you may store and have graded and advertise your product for sale and thus attract the different buyers eliminating the local buyer and the tying of yourself to one dealer. In this way you place your product open to the markets of the entire country. Third, that you appoint a committee to investigate and study the maple product question, one member of this committee to be the Commissioner of Agriculture, one member from the Extension Service Department and

one man from each county, they to report at as early a date as possible. Fourth, that you publish annually only the names of members who have paid their dues for the past year; the printing of the names of members who are deceased, and who have sold their farms, moved out of the State or retired is misleading and injurious.

MERRILL J. CORLISS,
Secretary.

The report was accepted and adopted.

TREASURER'S REPORT OF THE VERMONT MAPLE SUGAR MAKERS' ASSOCIATION.

January 1st, 1921.

CASH RECEIVED.

1920			
Jan.	1	Balance in Treasury	\$ 166.17
Feb.	24	C. O. Ormsbee	153.50
	24	State of Vermont, annual appropriation..	500.00
	1	From Vermont Dairyman's Association.	128.00
	30	From L. L. Story, Treas.....	15.00
Dec.	27	From membership fees	101.00
	27	From labels	84.98
Total receipts			<u>\$1,148.65</u>

CASH PAID OUT.

Mar.	30	Dean W. Edson, printing.....	\$ 7.75
	30	P. B. B. Northrop, auditing and attend- ance	13.53
	30	Miss G. F. Smith, reporting.....	22.49
	30	V. I. Spear, attendance executive meeting.	8.00
	30	H. M. Hoskinson, attendance executive meeting	14.42
	30	W. S. Dodd, attendance executive meeting.	6.02
	30	M. J. Corliss, money advanced secretary.	15.00
Apr.	20	Helen S. Dodd, premium.....	50.00
	20	D. E. Giddings, premium.....	5.00
	20	M. G. Lamson, premium	5.00
	20	M. G. Lamson, premium.....	10.00
	20	George Ladeau, premium	8.00
	20	Edward Gravline, premium	8.50
	20	J. P. Spear, premium.....	9.50
	20	F. F. Spear, premium	9.50
	20	E. G. Wertherby, premium.....	10.00
	20	Jennie Badger, premium	6.00
	20	Martin Prindle, premium	9.50
	20	Guy Prindle, premium	9.50
	20	Guy Magoon, premium	10.00
	20	W. F. Field, premium	9.00
	20	A. T. Curtis, premium	8.00

COOPERATIVE MARKETING OF MAPLE SAP PRODUCTS.

BY G. H. COLLINGWOOD, ASSISTANT EXTENSION PROFESSOR
OF FORESTRY, NEW YORK STATE COLLEGE OF AGRICULTURE,
AT CORNELL UNIVERSITY,
ITHACA, NEW YORK.

At some future time when a history of American agriculture is written, this particular period will be known as one of great cooperative effort. I sincerely hope it may be known as one of successful cooperation. Whether or not it will be successful will depend largely upon the business and sales methods adopted by the cooperating farmers. Confidence in the fellow members and the officers of the association is fundamental to the success of such an organization. But confidence without business methods is like building a house upon sand.

The farmer's job is primarily one of production. This has become increasingly true in recent years because of the tremendous pressure which has been put upon farmers. As the population has shifted from the rural districts to the city the farmer has faced the problem of producing and harvesting increasing crops with less and less man power. Fortunately this has been largely offset by an increasing amount of efficient, labor saving machinery. The sacrifice has been largely in distribution rather than in actual production.

Let us take the case of maple sugar and sirup in which we are particularly interested. In spite of the many rumors which we may have read, (or ourselves given rise to,) the maple sugar industry is not on the wane. Statistics since 1850 show that the annual production has not shown any particular decline. During 1920 the total production in terms of sugar, for the thirteen leading maple sap products states was 36,373,080 pounds; in 1919 this was 41,004,533 pounds; in 1918 it was 52,512,977 pounds which is within 400,000 pounds of the largest production recorded for the United States as a whole; and in 1917 the production was 45,127,450 pounds. It is true that the war and the shortage of sugar stimulated this production. But something had to! Until that time the price as paid to the producer had little encouragement, for it was not offering any large profits to the producer. He was too busy doing his regular

farm work to give any attention to searching out a market. "Besides it did not cost anything to produce maple sugar! The trees were there any way and no one could expect to do anything else during sap season." This was the sentiment of many producers.

But that line of talk did not appeal to many of the farmers who were beginning to compare costs with receipts. Then the price of maple lumber began to advance and more sugar producers sold off their trees to be made into flooring, or shoe lasts,—or tooth picks. The farmer got his money all in one lump, and much easier than thru the annual drudgery of the sugar season. But in neither case did he sell to advantage! Whether he sold maple sugar, or sirup, or lumber, he took that which was offered him. Of course, when he began to see the wide discrepancy between what he received and what the consumer paid the farmer complained a little. But it was the ineffectual complaints of individuals crying as one in a wilderness. One large agricultural paper has built up a strong support with its fight to increase the farmer's 35c dollar.

Some theoretical individuals talked about cooperative organizations. Occasionally one was tried, but usually it ended in failure. It is always so much easier to trust someone else than one's immediate neighbor. Besides in the mind of many people cooperation should be done freely as between friends. There should be no profits but rather a distribution of dividends,—therefore there should be no wages or salaries. It was too often a case of "let George do it."

Usually a business competitor could break up a cooperative association without any great demonstration of astuteness. A little jockeying of prices and an occasional scandalous rumor concerning the officers would usually do the trick. Then business went on as usual, and the farmer producer was left holding the bag. Is it any wonder that the farmer has gained the reputation of being a failure when he tries to effect a cooperative selling agency.

About ten years ago the California cooperative marketing associations began to loom upon the horizon. They seemed to have struck a new idea. A business organization of farmers was formed. They were incorporated under the laws of the state, and a group of highly trained business specialists were hired to run the company. The farmers signed contracts to sell all of their crop thru the association. This contract read not for one year, but for a term of several years to come. The orange growers were able to give their time to raising oranges, and the prune growers to raising prunes, etc. The men in the selling organization

gave their time to selling, and the result is well known to every person who is interested in agricultural cooperation and fundamentally in agricultural prosperity.

While it is true that the success of these western associations rests upon the confidence which the growers have in themselves and in their organizations, it rests equally upon the fact that the organization is built upon thoroly business like methods.

The recent years have seen a rising market on sugar, and sellers have been able to more or less command prices. Within the past six months we have seen a complete revolution and to-day we are in the midst of a falling market and a buyer's strike. It is no longer a seller's market, and luxuries especially are being eliminated to a greater and greater extent.

Maple sugar and maple sirup are luxuries. We might as well admit that from the start. I doubt if any scientist can help this industry out by discovering any vitamins or enzymes in maple sugar which are peculiarly essential to human life, and which cannot be duplicated in cheaper foods. It is the flavor which gives the peculiar value to maple sap products. Maple sugar has been a luxury in this country since about 1875 or '80 when cheap cane sugar came on the market. The only time since then that the two sugars have been in competition was during the recent sugar shortage and high prices resulting from the war. We may expect the ratio between granulated sugars and maple sugar to grow steadily wider and wider, as the peculiar flavor becomes more widely known and more generally in demand.

The recent high prices of maple sugar have awakened renewed interest in the industry. Coupled with this the scarcity and high price of farm labor has forced many producers to think about costs, and to consider ways and means of increasing the return for the effort expended. Some few looked to increased efficiency in production, but the great majority who had not lost faith in their old ideal of cooperation looked to that as a possible panacea.

In New York State during the past three years we have been witnessing the formation of county maple sap products cooperative associations. The first of these was in Cortland County in 1918. During 1919 incorporated associations were formed in Delaware, Franklin, and Wyoming counties. Besides this there were at least three unincorporated groups of producers thruout the state. In preparation of the season of 1921 other associations have been, or are being formed in Allegany, Cattaraugus, Lewis, and

St. Lawrence Counties. St. Lawrence County expects to have nine local associations which will probably be combined into one county association. Local associations are formed at shipping points wherever sufficient sirup can be collected to fill one or more cars.

No aggressive sales policy was entered into by any of the associations. In nearly every case the old channels of trade were continued. The effect of a group of farmers working together did result in materially increasing the price paid. In some cases this was not more than twenty-five cents on a gallon while in others it was as much as a dollar. It was, however, of purely local influence, rather than for the industry as a whole, and no surety was offered for the price of next year's crop.

The Cortland County people have gone further than any other association. Besides financing the purchase of steel drums in which to ship the sirup, they have purchased an old milk shipping station. This has been equipped for rectifying and grading, bottling, labeling and storing the sirup. Owing to a variety of circumstances they are now caught with a considerable quantity on hand. It is unfortunate because now whenever cooperation is discussed in that vicinity some one is sure to ask, "How about all that sirup which the Cortland County Association has on its hands?" As a matter of fact it is not unlikely that this will result in saving the situation not only for Cortland County, but be indirectly responsible for putting the maple sap products industry permanently on its feet.

It may be well to look at two associations which have made a partial success during the past year.

The Cortland County Association is built on a good idea, it is incorporated under a highly satisfactory law, but it lacks real business methods. It falls short when it comes to disposing of any large quantity of its product. Until markets can be developed the association will find itself butting its head against a stone wall.

The officers of the association are highly reliable, conscientious men who are busy with their regular farm operations. They live for the most part a long ways from the central bottling plant, and can only get there by taking the best part of the day away from their regular duties. Instead of doing the directive work and laying out a policy such as officers, or the board of directors should be required to, they have been forced to do much of the detailed supervision. They have had to carry on considerable correspondence and bear all the worry which would go with a profit making industry. They, themselves, have received no

salaries, and I believe I am right in saying that they have done a considerable amount of travel without even receiving expenses in return. The only paid employee has been a man who takes no responsibility, but who works entirely under orders given from above. This is too typical of many co-operative associations to warrant further comment. Needless to say, the organization cannot be expected to live under these circumstances. It is now undergoing a change which I sincerely hope will result in rejuvenation.

The Delaware County association has not attempted anything quite so elaborate as the Cortland people, and owing to one or two circumstances has been much more successful. I think chief among these circumstances is the fact that the assistant county agent was able to give all of his time to the association for a period of six weeks as manager. He in turn hired a farmer to help him grade and load. The total cost of extra help for handling several thousand gallons of sirup was only a little more than \$40.00.

In the spring of 1920 a maple sirup buyer came into Delaware County offering \$1.63 per gallon for sirup. Many farmers realized that this was below the cost of production, and several of them were instrumental in organizing the association. A fee of \$1.00 was fixed as annual membership dues, and each member gave a promissory note for \$50.00 to be used as collateral with which to borrow money necessary to carrying on the business. With this money a carload of steel drums was purchased. However, there seemed to be considerable misunderstanding as to just what a collateral note meant. Many of the members became nervous because the association held their note for \$50.00. In order to take care of these people and allow no misunderstanding to arise, the following plan was finally resorted to in order to pay for the drums:—

The drums were distributed according to the estimated production of the various members. Each man receiving a drum was required to pay for that drum in full. He could do this in cash if he desired, or have that amount taken out of his sirup. The association issued him a certificate of indebtedness upon receipt of the money. A rental sum of \$2.50 per year for each drum was established. These certificates of indebtedness could be turned in each year and reduced at the rate of \$2.50 for each drum used. Finally when the certificate of indebtedness is paid off, the rental will have accumulated sufficiently so that new drums can be purchased to replace the old ones which are out of commission.

For example, the drums cost \$11.20 each. Every producer was charged for the number of drums he ordered; thus, if he took three, it would cost \$33.60, to be taken out of his sirup or to be paid in cash. A rental sum of \$2.50 was charged for each drum per year. In the case of three drums this was subtracted from the \$33.60 so that a certificate of indebtedness for \$26.10 was issued to the holder of the drums. This could be presented the next year with no extra cash, and the rental value of the necessary number of drums subtracted from this, and a new certificate of indebtedness issued. Thus at the end of several years the certificate would be paid up. This rather clumsy system allowed the association to take care of its obligations to the bank and to satisfy most of the fault-finding members.

The drums were found most satisfactory for shipping the sirup. It was collected at a central point and tested for quality, weight and color. In order to encourage the manufacture of better products, three grades were established—fancy first, first and second. They paid fifty cents a gallon more for the fancy first and the first than for the second, which in the long run should tend to increase the amount produced of the better product.

The expenses of this association were comparatively small; no salary was paid to the manager, but necessary help for him was hired. They amounted to about three cents per gallon and were shared by all members whether they marketed thru the association or not, in proportion to the amount they sold. In other words, anyone selling to private customers had to pay three cents per gallon just the same as if he had marketed through the association. This was checked up by having a contract which required all of the saleable product to be sold through the association unless special permission to do otherwise was secured from the secretary.

The association was a success, but it does not guarantee anything for the season of 1921. Its very existence depends upon the energy of one or two men.

It is not desirable to go into detail with any more of the associations, but a few points with regard to organizing and managing such county associations are worth recording.

Contracts should be prepared requiring each member to deliver all sirup for sale to the association.

Inducements should be made to encourage the manufacture of high grade products.

Where individuals have had private customers, this business may either be turned over to the association or

consent of the association may be secured by the producer to fill these orders direct. In practically every case the orders can be filled direct, thus establishing that much desired contact between producer and consumer. However, the producer may be required to pay the association a limited amount per gallon for the product which he markets alone.

If business is to be done with wholesalers the sirup should be put up in galvanized steel drums and not in gallon cans. This allows for greater ease in sampling and more efficient shipping. Contracts between the association and the wholesaler should include a clause requiring that these barrels be returned in good condition within a specified time.

Wherever possible sirup should be inspected at the shipping station and sold f. o. b. cars.

Care should be taken to draw up contracts with dealers in such a way that they cannot raise technical objections after the sirup is in their possession.

These problems are typical of those of individual associations which intend to take advantage of old established routes of trade.

It is apparent to all of us that if conditions go on as at present with a number of marketing associations in New York state, some in Vermont, one in Michigan, Ohio and other states, working independently of one another, that we shall meet a most undesirable situation in which the various associations will unconsciously be working in competition with one another until one of them will have its throat cut by individuals and associations which should be friendly with it. There seems only one way to overcome this. This is by a federation of the maple sap products cooperative associations. Until there is such a federation to which representatives may be sent to make agreements on marketing, price making etc. the maple sirup industry will continue to be on a rather unstable basis.

The several New York county associations are now considering such an organization whose primary purpose will be to give the central federation the duties of marketing. They have appointed a committee of seven men to make a thoro investigation of the marketing possibilities of the maple sirup and sugar crop. The function of this committee is to bring together all available information, dealing not only with the marketing possibilities, but also with the type of organization most suited, the states which can best be considered to be a part of it, methods of financing, as well as methods of manufacturing and warehousing. It is

the same kind of investigation as any group of business men might be expected to require before venturing into a new business field. The work will be done as rapidly as possible, and a report will be made within two or three weeks. There must be very prompt action if we are to expect any results this year. Contracts will probably be signed by the producers direct with the central federation. Probably the business of the association will be carried on thru the locals and from the locals thence to the central association, where a board of directors will outline the policy for certain business or sales managers in carrying on the work. To be successful the marketing and sales organization of the central federation must be given the full confidence of the producers, and it should be stripped of all unnecessary red tape or other incumbrances.

If such a marketing association is to be wholly successful, it must be in a position to control the considerable part of the market. How much is impossible to prophesy. It should include not only New York state producers, but the producers of Vermont and as many other states as can be brought within the scope of organization.

The California Citrus Fruit Growers control only about one-fourth of the total orange crop of the United States, yet they are the principal factors in setting the market price of oranges. An association consisting of New York and Vermont producers could control more than one-half of the total sirup crop of the United States. Theoretically, it is possible to control two-thirds of the crop. It is not unlikely that other states could be brought in.

Furthermore, it should be remembered that we are dealing with a crop of limited production. At no time in the history of this country has the maple sugar and sirup crop amounted to more than the equivalent of fifty-three million pounds of sugar, which is less than seven million gallons of sirup. In recent years our production has averaged only a little more than the equivalent of five million gallons of sirup. This material is marketed largely in the northeast whence it comes. It is true that a considerable

quotations run from \$4.00 to \$4.50 per gallon wholesale. Further west it is scarcely to be found. We have a remarkable opportunity for marketing this, to be compared only with some of the already successfully marketed crops such as oranges, lemons, prunes, raisins and English walnuts, as cooperatively sold by the California producers.

Probably no better opportunity for organizing such an association ever existed in the history of this country. It is our desire to make each phase of agriculture as profitable as possible. We have experienced a series of several years of high prices, and we are now seeing these prices shattered. There is a certain relation between cane sugar and maple sugar. I am not prepared to state what that relation is. At the present time there is normally a wider gap between the prices of these two sugars than there was in the old days of very cheap labor before this country and Cuba produced the bulk of the world's sugar. If we do not have some association for marketing maple sirup we are likely to be faced with a falling price of maple sirup. Sugar has gone down, ordinary table sirup and maple sirup blends are struggling to hold up, honey finds more or less of a glutted market and indications show that most of the buyers are not disposed to stock up heavily on maple sirup this year. Certainly not unless the price is low.

There are many consumers who do not know what maple sirup is, and there are others who in order to get it have to pay a sum which would look most desirable to any producers here in the east. For these reasons alone it behooves us as producers of maple sirup to give thought to the cooperative marketing of our special product—namely: maple sirup.

The New York producers have already launched the campaign for a business like organization to sell it. We are not especially anxious to make it alone New York State sirup. We feel that this is a big industry covering the wide area of the northeast, which can most profitably be put on its feet by combining the bulk of the producers. But we will need your help to put it across. It is our object to present this matter not only to your people in Vermont, but also to many of the other large producing states. It will be necessary before this goes through to make some agreement with Canada, in order that her cooperative association will not cut the throat of our cooperative associations. Canada already has an effective marketing organization, which I believe would be very glad to cooperate with us.

Before I close let me summarize the situation and make perfectly clear in your minds what the objects of such a sales association would be.

1. Maple sap products are a luxury, dependent for their profitable sale upon the peculiarly delicious flavor.

2. They are limited in production (a) by the area where maple grows, and (b) by the number of maple trees.

3. The market has never been cultivated. It might include all the U. S. and some foreign countries like England and France.

4. The farmer is too busy producing and harvesting crops to devote very much time or thought to the sales and distributing end of it.

This brings us to the objects of such an association.

1. It is not to lock up the sirup and sugar until we can get a higher price because of scarcity, but rather by publicity and if necessary national advertising to so broaden the market that the prices can be raised because of the increased competition of buyers. It is as if we are to construct a pyramid, the height of which will be determined by the base,—providing there is sufficient material.

2. As demand is increased, an increased production must necessarily follow. This must be accomplished thru more efficient methods of production, and by tapping or developing resources which are at present unutilized.

It is only on such a basis that as a state employee, and as a forester that I am at all justified in urging such an organization upon you. I am convinced, however, that it will result in greater prosperity to the maple growing sections of this country; it will provide the consuming public with more of a delightfully toothsome delicacy which many have sought for in vain; and last it should tend to preserve the maple forests and encourage the growth of more upon land not usually adapted to other crops.

ADVERTISING OUR PRODUCTS.

W. H. CROCKETT.

Advertising no longer is an experiment. It has been demonstrated over and over again that judicious advertising pays. Our task, therefore, is to find out what constitutes judicious advertising. There are many methods, some of them very old, some of them very new, some of them wise, some of them unwise, and some on the border line or in the twilight zone between the two.

It may be true, as the old saying has it, "that we are advertised by our loving friends", but in these strenuous days very often our friends are busy and not infrequently they have other friends. It is also true to a certain extent that good goods advertise themselves, that a satisfied customer is the best kind of an advertisement. There is a certain amount of truth in the saying attributed to Ralph Waldo Emerson that the world will make a path to the doorway of the man who has the best article to sell. All these things, however, are true with certain very important qualifications. There are five fundamental principles in advertising. The first is to gain attention, the second is to arouse interest, the third is to create desire, the fourth is to establish conviction, the fifth is to secure action.

Persons will not buy pills or mousetraps or automobiles or maple sugar unless they know something about the article in question, something about our particular article, that we are offering, and there must be some good reason why our articles should be purchased rather than a competing article. Some products are easy to sell and for others rather careful and elaborate preparations must be made before the desire to purchase can be aroused. Maple sugar is one of the articles that is or ought to be easy to sell. Of all the sweets that have been produced nothing is more delicate or palatable than the products of the maple tree. There never was a time when so many sweets are being sold as at the present time, and the demand is steadily increasing. Almost always the words maple sugar or maple syrup suggest Vermont. That fact alone is worth a vast deal to this state. It would take hundreds of thousands, perhaps millions of dollars in advertising to establish that association of ideas if it did not previously exist.

The maple sugar producers of Vermont cannot afford to stand still. The state of New York is leading us in production but New York does not suggest maple sugar, or putting it the other way as may be done more properly, maple sugar does not suggest New York in the mind of the average buyer. Vermont has and may keep the advantage. New York is much larger than Vermont and it may not be possible to recover the lead from the empire state, but are we doing our best in Vermont both in quantity and quality of our production of maple goods.

According to statistics that have been furnished by the Department of Agriculture, there are many maple trees that are not tapped, and it is probably true that much maple sugar and syrup of an inferior grade are produced. Too many maple sugar orchards are being cut for the sake of marketing maple wood at a high price. It is also worth considering whether it is not worth while to plant maple orchards or at least to cut our forests in such a way that the young maple trees may be left standing for the benefit of future generations.

I realize that there are many things to consider in connection with the production of maple sugar. The labor problem has been very serious but conditions apparently are not as difficult this year as they have been for several years past. It is also true that the investment for the production of this crop must be made for a period of only a few weeks and that the equipment must lie idle a great part of the year. The climate is somewhat uncertain, and it is always something of a gamble as to the kind of season that we shall have. This holds true, however, to a certain extent in regard to all agricultural production. It is worth while to remember on the other hand that the sugar maker is utilizing land usually not tillable and that he is working at a season of the year when farm tasks are not particularly pressing.

There are certain important lines of manufacturing in which the revenue from the by products represents the difference between success and failure. If the by-products of the farm do not furnish the margin of profit for the year, they may add materially to that profit.

Maple sugar is or should be a high grade product which suggests a refinement of taste almost native in its

drawn from the tree in the springtime and is refined into a sweet that really has no competitor anywhere in the world. Maple sugar is a luxury. There does not begin to be enough of it to supply the demand that may easily be created.

One of the difficulties to be met is the wholesale adulteration of the product and the various blends and mixtures that are put upon the market. I presume it is not true now that we have pure food laws on our statute books that there is the same adulteration that there was twenty years ago. It used to be said that more maple sugar was made in Chicago than in Vermont. A mixture of brown sugar flavored with an extract of hickory bark has been made in large quantities and put upon the market without ever coming in sight of a maple tree. Again a small quantity of strong impure maple sugar has been used to flavor a product in which brown sugar or white sugar formed a considerable portion of the combination. A good deal of this strong low grade maple sugar has been used for flavoring plug tobacco. This seems like a great waste, when we consider that with a little more care and effort this same maple sugar might be produced as an article which would be classed among the finest table luxuries.

One of our greatest needs is to convince the public that the light colored maple products are pure and that the dark products are impure. Probably a large majority of the people of this country associate maple sugar and syrup with a dark colored article not realizing that ashes and leaves and twigs and exposure to bacteria cause the dark color. They do not know that if maple sap could be kept perfectly clean and free from bacteria, the product would be as white as the whitest granulated sugar.

A few years ago a travel article contributed by a well known woman writer appeared in one of the best of our American magazines in which she alluded to a trip through Vermont and mentioned her stop at a Burlington hotel. On her bill of fare was griddle cakes and maple syrup, and she alluded to the fact that the syrup was suspiciously light in color. There are tens and hundreds of thousands of people who think that the light colored article is light because it has been adulterated with white sugar. What the maple sugar makers of this country must do is to educate the public to the fact that the light colored article is pure and the dark colored product is impure.

A few weeks ago there appeared in the Saturday Evening Post, a magazine with over 2,000,000 circulation, a long and exceedingly interesting article on the rather pro-

saic subject of potatoes. It contained much valuable information and was written in a very readable style. Now it ought to be possible for one of the clever contributors to this popular magazine to write an article on maple sugar and syrup which should be much more interesting than the story on potatoes. It would be worth while for your organization through the Governor of the State or some influential person to appeal to the publishers of this widely circulated magazine calling attention to the harm that was resulting from an erroneous idea and suggesting that fact that a particularly interesting story might be written on this distinctive Vermont product.

This matter might be taken up in a variety of ways and should not of course be confined to the Saturday Evening Post. I mention that magazine because it probably has a larger circulation than any other in this country. The department of agriculture and the bureau having in charge the enforcement of the Pure Food Laws ought to be willing to co-operate in combating this erroneous idea that prevails in regard to maple products. Advantage should be taken of every opportunity to publish articles in newspapers and magazines concerning the possibilities and palatability of Vermont maple sugar. All the publicity that can be secured through moving pictures provided these represent up-to-date modern conditions is good advertising for the industry and the State.

Two methods of advertising maple sugar are possible. The first involves co-operative production and marketing after the manner if not on the same scale as the operations of the Orange Growers' Associations. I hardly need to say that it would be advantageous if your association could be increased in numbers so that it might bring in practically every maple sugar producer in Vermont. An organization that will increase the output, improve and standardize the product, increase the profits and permit of some display will do wonders for your industry.

I recognize the fact that it is much easier to give this advice than it is to put it in practice. If money can be raised for advertising purposes, there will be no difficulty in selling guaranteed maple products on a large scale at fancy prices as table syrup, candies or fancy cakes. It is a question which will furnish opportunity for argument, whether it is or is not advisable to cooperate with New York and Ohio producers in general advertising with maple sugar and syrup or whether it is desirable to confine such a campaign entirely to Vermont. If the money can be raised for a Vermont campaign, then I should prefer very much to go it

alone because then the Vermont phase can be emphasized. On the other hand if money cannot be raised for an advertising campaign and can be raised through cooperation with the producers in the States mentioned, then I think such a campaign will be helpful and far better than none at all.

The other method of advertising which I have in mind may be conducted on a much smaller scale, its purpose being direct sales from the producer to the consumer. There are in this country a great many possible customers who want a pure high grade article, guaranteed as such, who are willing to pay better than the market price if they are sure the goods are as represented. This advertising may be done either by individuals or by small groups of producers. I would suggest that only such newspapers be used as circulate among well to do people. It will be money wasted to advertise in the cheaper and more sensational papers but rather you should utilize such mediums of advertising as the New York Times, the New York Evening Post, the New York Herald, the New York Tribune, the New York Evening Sun, the Boston Transcript, the Boston Herald, the Philadelphia Public Ledger and the Outlook.

Be sure your goods are first class in every respect, your containers neat and attractive and your stationery of good quality and neatly printed. It is possible with a comparatively small advertisement to build up a good trade. Many of these customers will become your regular patrons and if your goods are as represented, they will tell their friends about your products and your business will grow.

It is possible to send out circular letters but if you desire to keep them out of wastebaskets, it is advisable to send them as personal letters rather than as advertising circulars. If you get a list of city physicians or bankers or a list of high grade automobile owners, you are likely to secure customers who are willing and can afford to pay good prices for gilt edged goods.

How many people in America really know the taste and appearance of pure maple products, or have the slightest idea how maple sugar is made? The percentage who really know these facts is surprisingly small. We need a campaign of education, not only abroad but at home. We need to teach our own people that it costs only a little more to produce a first class article than one that is distinctly inferior. With the possibility of producing at best only a comparatively small quantity of maple product it seems like an inexcusable waste to use any of the output of Vermont maple orchards for the purpose of sweetening plug tobacco, and this is said with no particular prejudice against

tobacco, but is induced by the belief that maple sugar is a much more aristocratic commodity than tobacco in any form.

Let us begin by teaching the children in our Vermont schools that maple sugar is a product that is a credit to the State, a delight to the eye and the palate and one of the chief gastronomic joys of the earth. We are all desirous of developing a bigger and a better Vermont. In order to do this we must follow the lines of least resistance. We cannot compete with California in raising oranges or the Western prairies in growing winter wheat, or with Pennsylvania in mining coal, but there are a lot of things that we can do in Vermont and do well. We have reason to be proud of the fact that we can and do make the best maple sugar in the world; that no State can surpass us in quality of dairy products; that in no area of less than 10,000 square miles in America are there as many good dairy cows to the square mile as there are in Vermont. These are not the only points in which we excel, but they are the ones which are of particular interest to you who are gathered here this afternoon.

If we desire to increase rather than to decrease in population, to make the most of this Green Mountain commonwealth, then we must develop our natural resources by increasing our maple sugar output, our dairy products, our staple crops; we must utilize our waterpowers to a greater extent than ever before; we must increase our manufacturing and thus furnish a better market for our farmers; we must grow more apples; we must develop to a greater extent our mines and quarries and we must take greater advantage of our unrivaled scenic beauty to bring into this State more summer tourists and more summer home seekers. If we are to keep our boys and girls at home, we must teach them that there are opportunities, abundant opportunities in Vermont, and that they need not go to some far distant city or state in order to find a chance for useful and profitable employment.

WHY MAPLE SUGAR MAKING YIELDS SMALL PROFITS.

F. H. ABBOTT, EASTERN STATES FARMERS' EXCHANGE,
SPRINGFIELD, MASS.

A discussion of any phase of agriculture today demands treatment from two angles, namely, production and commerce. The farmer knows something about production, but his knowledge of the commercial side of his business—the purchasing of supplies and the selling of the finished product—is extremely limited.

In presenting something of the production problem, I submit the figures below, which represent the exact average costs of producing maple sugar and sirup in eleven orchards of Washington County in 1917. So far as I am aware no such figures have been compiled, previous to this, and I expect criticism. We cannot have absolutely correct figures along this line until many more producers have awakened to the necessity of keeping cost accounts, on this as well as other farm products.

MAPLE SUGAR COSTS, WASHINGTON COUNTY, 1917.

SUMMARY:

Average of cost records from eleven orchards.
Average number of acres, 18.
Average number trees in orchard 860.
Average number trees tapped 680.
Average production per orchard 279.6 gallons sirup.
Average production per tree (1917) 3.2 lbs. sugar.
Cost per gallon, maple sirup (1917) \$1.44 per gallon.
Cost per gallon, 1920 (estimated) \$1.89 per gallon.
Cost per pound maple sugar (1917) \$.183.
Cost per pound 1920 (estimated) \$.232.

DISTRIBUTION OF COSTS—CALCULATION.

	1917		1920
Sugar Orchard, 18A at \$105.50.	\$1,889.00		\$2,078.00
Interest 1 yr. at 6%.....	\$ 113.94		\$ 125.33
Equipment:			
Sugar House	225.00		247.50
Gathering Rig.	27.50		30.25
Buckets	132.00		158.40
Spouts	25.30		30.36
Storage Tank	18.20		21.84
Boiling Rig	114.50		137.30
Sugaring Off Rig	8.20		9.84
Ther., Strainers, etc.	14.80		17.76
	<u>\$ 565.50</u>		<u>\$ 653.25</u>
Int. on Equipment at 6%..	33.93		39.19
Depreciation 10%..	56.55		65.32
Labor Cost:			
Owner 141 hours at 30c....	42.30	50c	70.50
Help 277 hours at 20c....	55.40	35c	96.95
Team 161 hours at 25c....	40.25	40c	64.40
	<u>137.95</u>		<u>231.85</u>
Other Operating Expense:			
Containers	26.34		28.97
Labels	2.25		2.48
Boxes and Crates.....	3.62		3.98
Transportation	1.20		1.32
Wood	27.60		30.26
	<u>61.01</u>		<u>67.10</u>
	<u>\$ 403.38</u>		<u>\$ 528.79</u>
Cost per gallon syrup	1.44		1.89
Cost per pound sugar .....	.183		.232

If we carry out these costs and apply them to the sale of the material the possibility of Profit and Loss are astounding.

Had the eleven farmers whose cost figures make up this record, sold their product at \$1.25 per gallon, (the prevailing price in 1917), it would mean a loss of \$53.11 per orchard, or, if extended to cover the production of the State, it would figure, a loss of 8c per tree on 4,957,583 trees, tapped in Vermont that year, meaning \$396,606.64 loss to producers.

On the other hand, had a price of \$1.50 per gallon been secured, it would have turned this loss into a profit of \$16.17 per orchard or \$124,939.57 for the state.

The figures given for 1920 are merely estimated from known percentages of increase in the various items for that period, in order to bring the calculations up to date. Approximately the same ratio of profit and loss would show

for 1920 as for 1917, based of course, on the same average yield of sugar.

However the point to be made is that, in any case, the cost of production was actually more than 10 percent higher than the average sale price, and this is the reason why small profits are made by producers of maple products.

The remedy seems to lie in some effort to secure better prices. It would be difficult to get any material decrease in cost of production under our conditions of operation.

Here is where the commercial side of the question presents itself. It is up to the producer to look after this side of the business. No one else is interested in it except to make as much money as possible for his own ends.

I believe the cooperative marketing can solve this difficulty, but I am not in favor of the type of cooperation that attempts to hold up the dealers for a price. This is not based on economic principles.

We should accomplish our end by going after the business of selling our product along modern business lines, manufacturing a standard finished product that the public wants and then using up to date methods of putting it before them.

On account of our scattered locations and small individual business, our only salvation lies along cooperative lines, and in order to have a successful cooperative enterprise for this or other purposes, we must get into the right frame of mind.

We must be real cooperators. We must have the confidence to make definite contracts to sell our product thru such an organization without knowing what the price will be.

We can never succeed by the use of present cutthroat methods where one producer, or group of producers, bids against another in the same market. The answer is to get together and stick together. It can be done.

•

GILT EDGE MAPLE SUGAR.

W. H. VAUGHN, MIDDLESEX.

To manufacture good maple sugar all utensils must be kept clean throughout the process,—the cleaner the better and the sap boiled as quickly as possible,—the quicker after it comes from the tree, the better.

I do not need tell you how to tap the trees, but let me say this,—do not drive a spout that has not been thoroughly washed and scalded, or hang a bucket that is not clean. Many sugar makers produce good sugar the first of the season but as the season advances they grow more lax in their methods and a sugar of poor quality is the result. The right thing to do is to keep the quality high as long as possible in order to receive a top price for the product throughout the season, except the last run after the utensils get sour or the buds start when the weather is warm.

One of my neighbors (and I do not know of anyone who makes better goods all the way through the season) caked nearly 1,500 pounds out of a ton, that he sold for 60 cents or more a pound, during the past season. One spring he sold 300 pounds that went to Washington D. C. to be distributed to members of Congress.

I will return to the process of manufacturing, and follow it through to show how we manage: An easy way to wash spouts is to place two or three hundred in a bucket after having been cleaned sufficiently to get rid of pieces of bark and leaves; put in some soap powder and boil all a short time; drain and spread on a blanket or floor, and because of their being hot they will dry very rapidly. We use wood holders and draw tub, painted both outside and in, renewing with a thin coat of white lead and oil every other season, thus keeping them smooth and easy to wash.

The evaporator is one made similar to the Bellows Falls style, with partitions about the same, having a flat bottom. It will not boil as rapidly as the deeper boiling rigs, but is very easy to wash; it is cleaned as often as possible and the niter removed each day.

Strainers used are a heavy cotton for sap and flannel over a hoop hung on the syrup can for syrup. If the strainers are new and do not remove all the niter before they are well filled, we put on two. A large amount of

dust or dirt is removed from the sap while boiling by keeping the scum removed. The larger portion of it rises soon after the sap begins to boil, and by keeping the scum removed it produces a clearer syrup. During the season when buckets have to be emptied after a storm, they can be kept clean more easily by using a swab made by winding a strip of burlap around a strick, about a foot long; make the swab about four inches in diameter and five or six inches high; place the same in the bucket and stir a few revolutions, thus washing the bucket thoroughly.

We do not make sugar for the fun of it but rather for the money we get out of it; so we should manufacture the best sugar possible and put it up in the best package to meet the demand of the market. If you have a market for maple cream or syrup, secure the package your market calls for and put it up so as to be attractive. There is more money in cakes, but of course more work, but the more work we put in the more money we have. One day a few years ago we had some good syrup on hand and some washing to do. My brother and niece (a girl of 15) and I went to the sugar house about 9 o'clock in the morning, caked 120 pounds and got washed up about 4 o'clock in the afternoon; we got 40 cents a pound for the cakes, whereas 25 cents would have been the price in 10 lb. pails.

The whole process is the same until it is sugared off, then we stir about 3 pounds in a pail with a mixing spoon until it is ready to pour into the cake tins. The tins we use are an inch and three quarters square and half an inch thick,—twelve cakes to the pound. For packages, we use a one pound box, made of cardboard and a wood box similar to the 5 lb. butter box, that will hold five pounds of cakes.

There is a demand in the market today for a neat and attractive package, the contents being eaten as a confection.

One of the best advertisements we have is the neat package with the maker's name printed on it, with his guarantee of its being Pure Vermont Maple Sugar.

If one desires to sell syrup, a glass jar that would hold just a quart or a bottle that could be used after the contents had been removed would be a nice package. The common fruit jar holds more than a quart so one would not wish to use that unless he got the price.

There never was a time when the market was as good for first quality goods as the past season and the more good sugar produced the less there will be of the poor grade, this having a tendency to keep up the market.

REPORT OF COMMITTEE ON RESOLUTIONS.

Vermont alone among the States makes no appropriation to its State College of Agriculture, for instructional purposes. Its only contribution during two generations has been Morrill Hall. We believe it is high time that the State ceased being a minority of one. We call upon the present State legislature to heed the suggestion of Governor Hartness and to listen to the insistent call coming from the Vermont creameries. We urge the erection, equipment and maintenance of an adequate dairy building for the College of Agriculture; and we direct our officers to represent us before the State Legislature in behalf of this proposition.

We urge the reenactment of an annual basis of No. 106 of the Acts of 1919 in support of the several Farm Bureaus. We direct our officers to represent us before the State Legislature in behalf of this proposition.

We believe that the hands of the Commissioner of Agriculture should be upheld in the campaign which is being waged in cooperation with the Federal Department of Agriculture against bovine tuberculosis. His able presentation before us, setting forth the needs of his department in this campaign, has greatly impressed us. The delays therein due to inadequate State appropriation are exasperating and the results unfortunate. We believe that this work is in the interests of all the people, of consumers as well as producers; that it should be looked upon quite as much as a public health measure as one in the interests of agriculture. We urge the careful attention of the State legislature to his constructive and sane program.

The members of the Dairymen's Association listened last night with much interest to Professor Lockwood's exposition of the purposes and needs of the New England Dairy and Food Council. We appreciate its potentialities and its potency as an educational and advertising agency which seeks to extend the knowledge of the food value of milk. We believe the more that milk is used the better physically, intellectually, even morally, will be those who use it. We feel certain that its increasing use by school children will lead to the upbuilding of a sturdier citizenship in the years to come. We feel, furthermore, that its larger usage means greater prosperity to the producer, since in-

creasingly that bane of our business, the milk surplus, will be thrust into the background. From every standpoint, we heartily commend this fine piece of work to our entire constituency.

In an Association as large as ours, made up of mature men and women, inevitably as the years flow on, our necrological record increases. Doubtless many of our members pass away, the places which have known them know them no more, and because of the looseness of the tie which binds us and our wide dispersal throughout the State, we know not when we gather annually that they have passed away. But the fitting custom which has been established of noting briefly their passing, when it comes to our attention, is worthy of continuance.

A week ago tonight, at his home in Hartland, Mr. C. C. Gates, a longtime member of this Association, formerly its Vice-President, a frequent attendant at our meetings, a good farmer, breeder of registered Jersey stock of which he was justly proud, laid him down to sleep in the full expectation of waking in the morning for the morrow's round of labor; but he did not waken from that sleep in this world. A quiet unobtrusive gentleman, whose life and work had been an example to those about him, a sturdy, dependable, typical Vermonter, has passed on and "his works do follow him."

We of the Maple Sugarmakers' Association extend grateful recognition to our State Department of Agriculture for their cooperation with the officers of State Association in the splendid educational campaign carried out through the exhibit of maple products at the Eastern States Exposition at Springfield, the Vermont State Fair at White River, the National Grange at Boston, and the Connecticut Horticultural Exhibition at Hartford, Connecticut. We wish to make special mention of the personal efforts of Mr. Amos J. Eaton of the State Department of Agriculture and Mr. C. A. Badger of the Sugarmakers' Association.

We appreciate the recognition given us by the press, who have given us freely of their space in write-ups and announcements of meetings. We extend thanks to the officials of the University for their hospitality and goodwill in turning over their commodious quarters for our use. We commend and thank the machinery and food exhibitors for their efforts in making attractive educational displays.

J. B. CANDON, Chairman.
W. H. VAUGHN,
A. D. LYNCH.

THURSDAY EVENING.**BANQUET.**

When the doors of the spacious dining room of Hotel Vermont were opened at 8 o'clock every seat was quickly taken, and more tables and chairs were moved from other rooms to accommodate the members of the two associations and their friends. The banquet was one of the most enjoyable that the associations have ever held. A spirit of jollity and good humor pervaded the hall, and if the herds of lowing kine back home could have seen some of their staid masters and mistresses laughing, talking and wearing the vari-colored head dresses of carnival time, they would never have recognized them as the people who did the chores just the day or two before.

When Congressman Frank L. Greene was introduced as the presiding officer of the banquet, by President Harris of the dairymen, he received a royal tribute in the form of a rising ovation. Mr. Greene was his usual jovial self and kept the assemblage in good humor, and also gave a few words of advice. The burden of his talk was that "nobody ever got something for nothing." In this way he warned the farmers to be especially wary of accepting some of the later-day theories for the elimination of economic and social troubles. The lesson is that we must now take our medicine for the momentary debauch that the country has been through, and the sooner we do it the sooner it will be over.

The next speaker was Governor James Hartness, who asked the cooperation of the people in his program for the help of the worker, incidentally bettering Vermont, and affording a means of keeping the Vermont youth in Vermont. He made a general plea for continuity of service of the men in the various State departments that really do the work, but said that the honor of being governor of the State is too great for one man to occupy the place for more than two years.

President Guy W. Bailey of the University of Vermont made a few general remarks on the conservative character of the Vermont people and the general safety of the home in Vermont and expressed the hope that Vermont would cling to the sterling qualities that had brought her to her

present position, and he thoroughly clinched his remarks by the use of several well chosen and splendidly recited verse.

A pleasant break came in the program at this point, when Toastmaster Greene requested E. J. Parker of Grand Isle the only living charter member of the Vermont Dairymen's Association to stand that the guests might look upon this pioneer of good dairying in the State.

O. E. Bradfute, Vice President American Federation of Farm Bureaus of Ohio, the last speaker, treated the question of marketing farm products in a general way and gave every farmer and many who are not farmers, but consumers of farm products, something to ponder on regarding this subject. He told of how the farmer had never set the price on his product, but had let the buyer set it, and then also set the price for the commodity that was purchased with the money received in the earlier transaction. He said in the past the farmer has been forced to sell at inopportune times because no machinery was available to assist him in doing otherwise, and he urged organization in the matter of selling which will bring about beneficial results to the farmer that cannot be expected when the individual farmer acts alone.

Following the addresses Bennett Springer, gave a second entertainment of the week, in magic. This was the close of what was generally conceded by all who attended to be one of the best conventions that the two State-wide organizations have ever held.

THE MAPLES NOT FOR SALE.

Howdy stranger, wall how be ye?
Purty fair it seems tew me.
Want ter buy my young stock, stranger?
See your checkbook's on your knee—
Yer want ter buy my maples,
Standin' up thar on the hill?
No sir, I aint sellin,
An' what's more I never will—
No, there aint no use talkin'
Kids 'll have em after me.
An, an axe aint goin ter tech 'em,
Not er single maple tree.
When you're slashin of 'em, mister
Do ye ever stop to think
Of the sap that flows in Springtime
That's so sweet-like when you drink?
An' the syrup thick an' sweet, sir,
An' maple sugar too?
If you did I'm sure you'd find out
Cuttin' weren't the thing to do.
What! of syrup you haint tasted?
Well by gum it's time you did,
Say wife where's that syrup?
Send some out here by the kid—
There now stranger jest you taste it
Aint that flavor simply grand?
That is pure sweet maple syrup,
Very best I've got on hand.
Now don't you understand me?
They're the best thing on the farm;
And while wife and I are livin'
They'll never come to harm.
If you want my stock an' grain
I'll sell 'em without fail.
But I tell ye now, young mister,
My maples aint for sale.

MRS. HAZEL ABBOTT,
Cabot, Vt.

MEMBERS VERMONT MAPLE SUGAR MAKERS' ASSOCIATION.

A

Abbott, Sam Lee.....Bethel, Vt.
 Abbott, Walter L....Marshfield, Vt.
 Abell, H. L.....Enosburg Falls, Vt.
 Adams, Herbert W.,
 White River Jct., Vt.
 Adams, L. H.....Wilmington, Vt.
 Akin, J. R.....Newport, Vt.
 Aldrich, C. F....Springfield, Vt. R. D.
 Aldrich, A. W.....Springfield, Vt.
 Allbee, G. H....East Hardwick, Vt.
 Allen, A. F....So. Londonderry, Vt.
 Allen, C. H.....So. Royalton, Vt.
 Allen, Fred E.....So. Royalton, Vt.
 Allen, W. D....West Charlestown, Vt.
 American Felt,
 100 Summer St.,
 Boston, Mass.
 Amidon, O. W....Simondsville, Vt.
 Andrews, Mary L.....Dorset, Vt.
 Ashline, F. R....R. D. Worcester, Vt.
 Atkins, C. H.....Westmore, Vt.
 Annis, H. S.....Chelsea, Vt.
 Adams, B. H.....Chelsea, Vt.
 Ainsworth, E. J.....Walden, Vt.

B

Bacon, RichardChelsea, Vt.
 Badger, C. A....East Montpelier, Vt.
 Badger, Jennie,
 East Montpelier, Vt.
 Badlam, G. E. L.....Rutland, Vt.
 Bailey, L. J.....Williamstown, Vt.
 Bailey, W. E.....So. Ryegate, Vt.
 Baldwin, J. C.....Mt. Holly, Vt.
 Baldwin, R. G.....Mt. Holly, Vt.
 Barber, Hoyt H....Brattleboro, Vt.
 Barber, C. H.....Burlington, Vt.
 Barnard, E. Wellman,
 Springfield, Vt.
 Barnett, R. E.....So. Ryegate, Vt.
 Barrett, M. L.....Cabot, Vt.
 Barrett, C. H.....Thetford, Vt.
 Barston, ClintonNorwich, Vt.
 Bartholomew, A. V.,
 White River Jct., Vt.
 Bashaw, H. A....R. F. D., Orleans, Vt.
 Bean, F. H.....West Glover, Vt.

Beckwith, W. H.....Chelsea, Vt.
 Before, HenryNewport, Vt.
 Benedict, G. H.....Underhill, Vt.
 Bennett, Alice M....Brattleboro, Vt.
 Benton, JohnLincoln, Vt.
 Bigelow, F. M.,
 100 Williams St., New York
 Best, A. M.....Essex Center, Vt.
 Bigelow, James T.,
 Saxtons River, Vt.
 Billings, B. A. & Son,
 Rochester, Vt.
 Bingham, L. W....Middlebury, Vt.
 Bisbee, John C.....Moretown, Vt.
 Blanchard, D. L....Cavendish, Vt.
 Blanchard, F. W....Ascutneyville, Vt.
 Blanchard, I. C....Cavendish, Vt.
 Blondin, W. C.....Barnet, Vt.
 Bolster, Orrin E....East Dover, Vt.
 Borland, C. M.....West Glover, Vt.
 Boynton, S. B.....Morrisville, Vt.
 Bradley, R. J.....Moretown, Vt.
 Brigham, E. S.St. Albans, Vt.
 Brigham, Fred L....Norwich, Vt.
 Brimblecombe, R. S.,
 Marshfield, R. D. 2, Vt.
 Brock, John B....West Newbury, Vt.
 Bromley, Delos B.....Danby, Vt.
 Bromley, Duane P.....Danby, Vt.
 Bromley, Mrs. K. M....Danby, Vt.
 Bromley, Mrs. M. J....Danby, Vt.
 Bromley, M. J.....Danby, Vt.
 Bromley, Mott H.....Danby, Vt.
 Bromley, Nancy F.....Danby, Vt.
 Bromley, R. N.....Danby, Vt.
 Bronson, Miss Jennie,
 East Hardwick, Vt.
 Brown, B. B.....Danby, Vt.
 Brown, W. John,
 Middletown Springs, Vt.
 Bruce, FrankWarren, Vt.
 Brunelle, ZephireChelsea, Vt.
 Buck, MyronEast Bethel, Vt.
 Bugbee, E. J.....Tunbridge, Vt.
 Burbank, M.Orleans, Vt.
 Burnette, R. E.....Bethel, Vt.
 Burnham, T. K....Bristol, R. D., Vt.
 Burton, E. S.....Mt. Holly, Vt.
 Butler, A. E.....Moretown, Vt.
 Burbank, HenryChelsea, Vt.

Badger, E. J.....Marshfield, Vt.
Barrett, O. F.....Cabot, Vt.
Barrett, David M.....Cabot, Vt.
Bradley, Thomas,
64 N. Prospect St.,
Burlington, Vt.

Bromley, KirkDanby, Vt.
Bromley, HughDanby, Vt.
Bromley, Mrs. Maurice..Danby, Vt.
Bromley, Mrs. Martin...Danby, Vt.
Brock, H. S.....Montpelier, Vt.
Blood, F. T.....Woodstock, Vt.
Beck, JoryenChelsea, Vt.
Bacon, Leonard H.....Chelsea, Vt.
Bromley & Holmes.....Danby, Vt.
Buzzell, Thomas G.,
Cuttingsville, Vt.

Buckley, W. A.,
North Clarendon, Vt.
Baird, R. O.Pittsford, Vt.
Bassingthwaighte, G. E.,
Strafford, Vt.
Bicknell, Allen,
Underhill Center, Vt.

C

Clark, WinslowShoreham, Vt.
Cady, H. H.Jericho, Vt.
Cameron, Wm. W..West Glover, Vt.
Carleton, A. A...West Newbury, Vt.
Carleton, A. H...West Newbury, Vt.
Carlton, E.,
21 Highland Ave., Barre, Vt.

Carlton, S. W. & Son...Chester, Vt.
Carpenter, C. H. & Son,
Enosburg Falls, Vt.

Carver, Chester E.,
Simondsville, Vt.

Carey, Geo. C....St. Johnsbury, Vt.
Chaffee, C. E.....Irassburg, Vt.
Chamberlin, H. B.....Irassburg, Vt.
Chamberlin, W. C.,
South Ryegate, Vt.

Chandler, W. G. & Son,
West Danville, Vt.

Chapin, H. B.....Middlesex, Vt.
Chapin, J. A.....Middlesex, Vt.
Chapin, M. E.....Middlesex, Vt.
Chase, PerryEast Fairfield, Vt.
Cheney, S. T. R.,
Mount Vernon, N. Y.

Church, F. A.....Bellows Falls, Vt.
Church, W. E.,
R. F. D. 1, Derby, Vt.

Clark, C. C...R. F. D. 3, Bristol, Vt.
Clark, E. L.....Glover, Vt.
Clark, Mrs. J. A....Brattleboro, Vt.

Clark, Roy G.....Belmont, Vt.
Clifford, A. E.,
R. F. D. 2, Starksboro, Vt.

Cloud, J. H.....Pompanoosuc, Vt.
Cobb, Charles R....Woodstock, Vt.
Cobb, George C.....Rutland, Vt.
Coburn, Harry L.,
East Montpelier, Vt.

Colby & Strawn,
R. F. D., Orleans, Vt.

Cole, W. W.....Enosburg Falls, Vt.
Collins, E. B.....Hyde Park, Vt.
Collins, C. W.....Strafford, Vt.
Collins, M. L.....Strafford, Vt.
Collins, W. H.....Strafford, Vt.
Colvin, C. H.....Danby, Vt.
Colvin, Mrs. C. H.....Danby, Vt.
Colvin, N. E.....Danby, Vt.
Colvin, NellieDanby, Vt.
Colvin, John C...West Rutland, Vt.

Cook, A. H.,
Middletown Springs, Vt.

Cook, L. E.....Cambridge, Vt.
Coolidge, A. W....Bellows Falls, Vt.
Coolidge & Sessions,
Bellows Falls, Vt.

Coolidge, O. J.,
South Londonderry, Vt.

Corbett, E. B..West Brattleboro, Vt.
Corbett Bros.,
West Brattleboro, Vt.

Corbett, V. S..West Brattleboro, Vt.

Corry, Dewey.....Danby, Vt.
Coville, Albert F.....Andover, Vt.
Cram, M. F.....Bridgewater, Vt.
Crawford, B. R.....Montpelier, Vt.

Croft, A. J.,
Sec. Franklin County Pure
Maple Sugar and Pure
Maple Syrup Co.,
Enosburg Falls, Vt.

Curtis, A. T.....St. Albans, Vt.
Cutting, Frank A.,
79 Summer St.,
Boston, Mass.

Churrier, Jed. R. F. D. 1, Fairfax, Vt.

Corliss, N. L.....St. Albans, Vt.

Chamberlin, W. E.,
R. F. D. 1, Randolph, Vt.

Cross, JosephFairfax, Vt.
Crofut, C. H. & Sons..Arlington, Vt.

Clark, Mrs. J. A. & Son,
Brattleboro, Vt.

Corvin, RussellChelsea, Vt.
Camp, Don V.....So. Barre, Vt.
Corliss, M. J.....Montpelier, Vt.

D

Daniels, B. W. Middlesex, Vt.
 Daniels, Sam Hardwick, Vt.
 Davis, G. A. Rutland, Vt.
 Davis, John P. Chelsea, Vt.
 Davis, Smith G. Montgomery, Vt.
 Day, Edmund Newport, Vt.
 Day, L. S. Irasburg, Vt.
 Divoll, F. P. Springfield, Vt.
 Dobias, John Colrain, Mass.
 Dodd, Helen. South Newbury, Vt.
 Dodd, Walter Sedgwick,
 South Newbury, Vt.
 Drinkwater, Forrest. Plainfield, Vt.
 Dow, Ora Vershire, Vt.
 Dow, Horace N. Middlebury, Vt.
 Dumont, Henry Chelsea, Vt.
 Dunnett, G. H. South Ryegate, Vt.
 Durant, J. H. West Newbury, Vt.
 Dutton, E. E. R. F. D., Orleans, Vt.
 Dutton, Geo. L. South Royalton, Vt.
 Dutton, R. A. Orleans, Vt.
 Dwinell, Earle G. Plainfield, Vt.
 Daniels Bros.,
 R. F. D. 1, St. Johnsbury, Vt.
 Darling, E. A. East Burke, Vt.
 Davis, H. E. Cambridge, Vt.
 Davis, Ray E. St. Johnsbury, Vt.
 Davidson, L. E. Springfield, Vt.
 Dickerman, George Chelsea, Vt.

E

Eastman, A. L. Groton, Vt.
 Eaton, C. H. Rochester, Vt.
 Egan, John P. Middlesex, Vt.
 Ellsworth & Sons,
 Jeffersonville, Vt.
 Emery, Hebert E. Plainfield, Vt.
 Emery, Nellie E. Plainfield, Vt.
 English, L. W. Woodstock, Vt.
 Erwin, W. S. East Corinth, Vt.
 Elliott, George G. Bristol, Vt.
 Eldred, Elmer H. Swanton, Vt.

F

Farmers F. A. East Burke Vt

Follett, O. W. Townshend, Vt.
 Forbes, Charles Andover, Vt.
 Foster, C. D. Cabot, Vt.
 Foster, E. M. Waterbury, Vt.
 Foster, Col. H. S. North Calais, Vt.
 Fuller, A. A. Warren, R. D. 1, Vt.
 Fuller, F. S. & Co.,
 Saxtons River, Vt.
 Fulton George B. Irasburg, Vt.

G

Gardner, Geo. C. Springfield, Vt.
 Gaylord, P. B. Waitsfield, Vt.
 George, F. A. Williamstown, Vt.
 Giddings, D. E. Bakersfield
 Gilbert, W. B. Woodstock, Vt.
 Gilbert, H. H. & Sons,
 East Fairfield, Vt.
 Gile, Geo. B. Jericho, Vt.
 Gillian, A. W. Cambridge, Vt.
 Giltman, Dean N. Chelsea, Vt.
 Goddard, M. F. Waterloo, Canada
 Going, G. A. Orleans, Vt.
 Goldthwaite, A. P.,
 Shelburne, Mass.
 Goodrich, Chas. T. Benson, Vt.
 Gordon & Elliott. Felchville, Vt.
 Gould, Mrs. J. Danby, Vt.
 Gould, J. Danby, Vt.
 Graveline, Edward Newport, Vt.
 Greene, M. T. Pawlet, Vt.
 Gregg, Leon E.,
 R. F. D. 3, Springfield, Vt.
 Grimm, G. H. Est. Rutland, Vt.
 Grimm, John H. Montreal, Canada
 Grimm, Nellie M. Rutland, Vt.
 Gross, E. A. R. F. D., Orleans, Vt.
 Grout, H. L. Perkinsville, Vt.
 Grout, Leon E. East Jamaica, Vt.
 Guyette, H. A.,
 North Montpelier, Vt.
 Goss, Chas. W. Barnet, Vt.
 Gillen, James E.,
 R. F. D. 1, Fairfax, Vt.
 Geash, Howard Fairfax, Vt.
 Grady, Fred C. Wheelock, Vt.
 Goodrich R. A. Chelsea Vt

Grady, J. H.....Lyndon, Vt.
Gates, Chas. W.,
North Hartland, Vt.

H

Hartley, Andrew..West Barnet, Vt.
Howard, D. D.....Fairfax, Vt.
Hutchins, F. B.....Northfield, Vt.
Hodgdon, A. M.....Cabot, Vt.
Hoyt, R. M.....Cabot, Vt.
Hunt, Rollo E.,
Richmond Hill, L. I., N. Y.
Hills, L. S.....Waterbury, Vt.
Hallett, E. H.St. Johnsbury, Vt.
Hiner, Alex C.....Fairfax, Vt.
Holbrook, L. E.....Irasburg, Vt.
Hoskison, H. N....Cuttingsville, Vt.
Hunter, Joseph N.,
East Burke, R. D. 1, Vt.
Hastings, Mrs. E. G.,
St. Johnsbury, Vt.
Heath, J. H.,
Lyndonville, R. D. 2, Vt.
Haile, C. H.....Montgomery, Vt.
Hall, A. R.....Derby, Vt.
Hammond, W. S.....Newport, Vt.
Harding, John S.....Vershire, Vt.
Harrington, F. E.....Windham, Vt.
Hart, Robert C.,
159 Nicholas Ave.,
Brooklyn, N. Y.
Haskell, N. M. & Son,
Wilmington, Vt.
Hatch, S. A.....West Danville, Vt.
Hathorne, G. B.....Barnard, Vt.
Hazzard, G. M.....Charlotte, Vt.
Hayes, Mrs. A. L....Strafford, Vt.
Hayes, F. W.....Strafford, Vt.
Hayes, J.Strafford, Vt.
Hayes, J. R.....Strafford, Vt.
Hayes, M. W.....Strafford, Vt.
Hayes, R. W.....So. Strafford, Vt.
Hayford, W. E.,
East Montpelier, Vt.
Haynes, C. C.....Wilmington, Vt.
Heald, E. I. & Son,
Proctorsville, Vt.
Heald, Percy E...Chester Depot, Vt.
Hendricks, A. S.....Franklin, Vt.
Hewes, K. F....So. Londonderry, Vt.
Hewes, L. K. & Son,

Higgins, Dr. J. H.,
Union Village, Vt.
Hill, Arthur S...Bristol, R. D. 1, Vt.
Hill & Clifford.....Starksboro, Vt.
Hill, E. K.....Middlesex, Vt.
Hills, Dean Joseph L.,
Burlington, Vt.
Hines, Bros.Hardwick, Vt.
Hogan, A. G....Bristol, R. D. 1, Vt.
Holbrook, P. H....West Burke, Vt.
Holden, Ira L.....Northfield, Vt.
Holden, W. W.....Northfield, Vt.
Holden, Arthur M.,
North Clarendon, Vt.
Holden, John C.,
North Clarendon, Vt.
Holden, JeromePutney, Vt.
Hooper, E. J...., East Fairfield, Vt.
Hopkinson, GeorgeDerby, Vt.
Horton, G. B.....Ludlow, Vt.
Howard, Dana I.,
West Brattleboro, Vt.
Howard, E. T. ..West Hartford, Vt.
Howe, ElmerTunbridge, Vt.
Howe, Will W.....Tunbridge, Vt.
Hoxie, Benjamin J.,
Proctorsville, Vt.
Hoxie, Will W.....Tunbridge, Vt.
Hubbell, M. L...Enosburg Falls, Vt.
Hunt, A. J.....Westfield, Vt.
Huntoon, Phillip J.,
Charlestown, Vt.
Hutchins, Walter D.,
North Woodstock, N. H.

J

Jackson, O. H.....Westford, Vt.
Jenne, A. M....Richford, R. D. 1, Vt.
Jennison, WilliamPawlet, Vt.
Jewell, Frank G.....Corinth, Vt.
Johnson, I. P.Craftsbury, Vt.
Johnson, JasonPlainfield, Vt.
Jones, C. H.....Burlington, Vt.
Jones, G. M.....Waitsfield, Vt.
Jones, E. H.....Waitsfield, Vt.
Jones, N. M.....Richford, Vt.
Jones, W. A.....Randolph, Vt.
Joslin, E. J.....Newport, Vt.

K

Kelley, C. B.....Derby, Vt.

Kinney, F. H. Springfield, Vt.
 Keeler, Harold C. Hyde Park, Vt.
 Kennett, Chas. L.,
 R. F. D. 2, East Hardwick, Vt.
 King, Dennis M.,
 R. F. D. 1, Fairfax, Vt.
 Kimball, C. H. Danville, Vt.
 King, T. A. Fairfax, Vt.
 Kirk, Irwin V.,
 So. Wallingford, Vt.
 Kew, C. H. Waitsfield, Vt.

L

Lamphere, Asa .. West Rutland, Vt.
 Lackey, E. A. Jamaica, Vt.
 Lackey, J. E. & J. A. Derby, Vt.
 Ladd, N. P. Richford, Vt.
 Ladeau, George .. Fairfield, Vt.
 Laird, G. A. Cabot, Vt.
 Lane, C. H. Middlebury, Vt.
 Lathrop, E. W. Vershire, Vt.
 Lawrence, E. D. East Fairfield, Vt.
 Leader Evaporator Co., The
 Burlington, Vt.
 Learned, Z. A. West Halifax, Vt.
 Leonard, T. A. Proctorsville, Vt.
 Lewis, R. C. Woodstock, Vt.
 Lewis, R. M. Woodstock, Vt.
 Lilley, J. O. Plainfield, Vt.
 Libbey, F. J. Newport, Vt.
 Lilley, Carl D. F. Plainfield, Vt.
 Lomborg, F. W. Arlington, Vt.
 Ludenn, Mrs. George,
 R. F. D. 4, St. Albans, Vt.
 Luxford, Leo L. Newport Ctr., Vt.
 Lyman, Dewey .. Hartland, Vt.
 Lyman, J. A. Hartland, Vt.
 Lyndon Home Project Club,
 Lyndon, Vt.
 Luller, W. B. Vershire, Vt.
 Libby, Frank .. Chelsea, Vt.
 Lutherly, George C. Chelsea, Vt.
 Larkin, Frank .. Tunbridge, Vt.
 Ladue, Mrs. G. A.,
 Jeffersonville, Vt.
 Lovenberg, Albert M. Putney, Vt.
 Lawson, Mrs. Sadie,
 R. F. D. 1, Montpelier, Vt.
 Landreville, Eugene,
 Perkinsville, Vt.
 Loveland, E. H.,
 139 Church St., Burlington, Vt.
 Lamson, M. G. Montpelier, Vt.

M

Mason, L. E. Barton, Vt.
 Mack, Wm. H. Ascutneyville, Vt.

Mackay, Donald,
 Mgr. Grove Hill Farm,
 Thetford Ctr., Vt.
 Magoon, A. R. & Son .. Newport, Vt.
 Maloney, Patsey,
 East Wallingford, Vt.
 Marcette, Mrs. E. H.,
 East Fairfield, Vt.
 Marcette, Eli H. East Fairfield, Vt.
 Marcette, Zora A.,
 East Fairfield, Vt.
 Marden, C. S. Londonderry, Vt.
 Marony, R. H. Rutland, Vt.
 Maraden, Geo. L. Northfield, Vt.
 Marcette, Miss Hazel,
 East Fairfield, Vt.
 Marcette, J. Armida,
 East Fairfield, Vt.
 Marcette, Joseph,
 East Fairfield, Vt.
 Marsh, Geo. F. Chester Depot, Vt.
 Marshall, H. C. Belmont, Vt.
 Martin, Arthur T. Rochester, Vt.
 Martin, C. E. Rochester, Vt.
 Martin, E. J. Montgomery, Vt.
 Martin, Orlando L. Plainfield, Vt.
 Martin, R. J. Rochester, Vt.
 Martin, Wm. E. Norwich, Vt.
 Martin, W. S. Plainfield, Vt.
 Martin, Wm. S. & Sons,
 Rochester, Vt.
 Mather, G. E. Readsboro, Vt.
 Matthews, Andrew C.,
 21 Watkins St., Rutland, Vt.
 Maxfield, E. C. Newport, Vt.
 Maxham, M. C. Worcester, Vt.
 May, Fred .. Wilmington, Vt.
 May, Fred H. Thetford Ctr., Vt.
 May, J. H. Burlington, Vt.
 McKnight, Geo. C.,
 East Montpelier, Vt.
 Merrifield, A. M. Williamsville, Vt.
 Merrifield, S. A. Williamsville, Vt.
 Merrill, John H. Roxbury, Vt.
 Metcalf, H. J. Underhill, Vt.
 Miles, McMahon & Son .. Stowe, Vt.
 Miller, H. D. Westfield, Vt.
 Miller, R. I. West Brattleboro, Vt.
 Miner, John F. South Royalton, Vt.
 Mitchell, E. M. Derby, Vt.
 Morey, B. S. Waterbury Ctr., Vt.
 Morrison, John G.,
 Cambridge, Mass.
 Morse, Ira E. Cambridge, Vt.
 Morse, L. B. Norwich, Vt.
 Moulton, F. R. Derby Line, Vt.
 Moulton, P. B. Weston, Vt.
 Muller, H. A. E. Brattleboro, Vt.

Munderloh, Henry
North Derby, Vt.
Murray, John S.,
South Cavendish, Vt.
Myott, JohnMontgomery, Vt.
Merrill, G. E.Sherburne, Vt.
Martin, L. F.Manchester, Vt.
Marcette, Miss Zoa,
Bakersfield, Vt.
Martin, E. C.Milton, Vt.
McMahon, J. D.,
R. F. D. 1, Fairfax, Vt.
Mulholland, Lionelle G.,
Montpelier, Vt.
Moran, T. H.Jericho, Vt.
Martin, Murray A.Plainfield, Vt.
McIntosh, L. D.South Royalton, Vt.
Maxim, E. A.Middlesex, Vt.
Magoon, GuyNewport, Vt.

N

Naramore, H. D.Orwell, Vt.
Neill, B. E.Warren, Vt.
Nelson, Geo. A.East Barnet, Vt.
Nelson, G. E.Barre, Vt.
Newell, Bernard W.,
West Wardsboro, Vt.
Newell, E. D.West Wardsboro, Vt.
Newell, Mrs. E. D.,
West Wardsboro, Vt.
Nichols, G. L.Enosburg Falls, Vt.
Niles, Allen P.Derby, Vt.
Northrop, FrankLudlow, Vt.
Northrop, P. B. B.Sheldon, Vt.
Nye, George W.St. Albans, Vt.

O

Ormsbee, C. O.Montpelier, Vt.
Orr, DonVernshire, Vt.
Orr, William J.East Ryegate, Vt.
Orvis, C. M.Bristol, R. D. 3, Vt.
Osgood, L. K.Rutland, Vt.
Osgood, O. D.Cabot, Vt.
Owen, M. J.Barton, Vt.

P

Page, Hon Carroll S.,
Hyde Park, Vt.
Page, R. G.East Corinth, Vt.
Page, W. B.,
Springfield, R. D. 3, Vt.
Palmer, Leon E.Westfield, Vt.
Park, O. H.,
West Burke, R. D. 1, Vt.
Parker, C. A.Irasburg, Vt.

Parker, Fred F.,
East Wallingford, Vt.
Patch, C. D. & Son...Hartland, Vt.
Patterson, F. L.Newport, Vt.
Pearl, Edwin S.Vernshire, Vt.
Peace, C. H.Marlboro, Vt.
Pease, Edward E.Weston, Vt.
Peavy, I. L.Morgan, Vt.
Peck Company...St. Johnsbury, Vt.
Peck, O. E. & L. E.,
Westminster, Vt.
Perley Eugene & Son...Richford, Vt.
Perry, Clarence E.Coventry, Vt.
Perry, C. D.Springfield, Vt.
Perry, E. B. & SonIra, Vt.
Phillips, R. D.Townshend, Vt.
Pike, Mrs. J. B.Marshfield, Vt.
Pike, J. B.Marshfield, Vt.
Pike, S. C.Montpelier, Vt.
Pittit, TelesphoreNewport, Vt.
Pitkin, E. W.Plainfield, Vt.
Plastridge, Wallace A.,
Northfield, Vt.

Plumley, Elmer ...Cuttingsville, Vt.
Powell, G. D.Mt. Holly, Vt.
Pratt, F. S.Montgomery, Vt.
Pratt, H. L.Cuttingsville, Vt.
Priest, S. J.Belmont, Vt.
Prindle, Guy M.St. Albans, Vt.
Prindle, MartinSt. Albans, Vt.
Prouty, H. C.Green River, Vt.
Purinton, C. F.Burlington, Vt.
Putnam, Fred A.,
Springfield, R. D. 3, Vt.
Putnam, Leon R.,
Springfield, R. D. 3, Vt.
Perry, Dolphus...East Fairfield, Vt.
Peabody, AmosMarshfield, Vt.
Perley, E. E.Richford, Vt.
Poquette, Mrs. Joseph L.,
St. Albans, Vt.
Perkins, J. D.Johnson, Vt.
Powers, Charles A.Pittsford, Vt.
Palaske, S. A.Stowe, Vt.

R

Ransom, H. E. & Sons...Chelsea, Vt.
Rathburn, R. H.,
R. F. D. 1, Bristol, Vt.
Rawson, Noble H.Windham, Vt.
Rice, A. M.Jefferson, Vt.
Richards, JohnBethel, Vt.
Richardson, H. B.,
Union Village, Vt.
Riford, H. P.Proctorsville, Vt.

Rinter, J. M., Mgr.,
Burlington Evaporator Co.,
Burlington, Vt.
Roberts, J. W....St. Johnsbury, Vt.
Roberts, M. B.....Rupert, Vt.
Robinson, D. F.....Pawlet, Vt.
Robinson, Frank F.,
West Danville, Vt.
Rogers, C. L.....Newport Ctr., Vt.
Rogers, B. O....West Newbury, Vt.
Rollins, Nathaniel & Sons,
Middlesex, Vt.
Rowe, E. L.....Barnet, Vt.
Rugg, F. L.....Putney, Vt.
Rumney, G. H.....Montpelier, Vt.
Russell, C. E.,
East Middlebury, Vt.
Russell, Frank L. Cuttingsville, Vt.
Russell, Thomas G.,
Cuttingsville, Vt.
Ryan, Earl M.....Cambridge, Vt.
Ryan, T. F...R. F. D. 1, Fairfax, Vt.
Roddy, C. S...R. F. D. 1, Fairfax, Vt.
Ridlon, John E.,
East Wallingford, Vt.
Rounds, Dora M.,
R. F. D. 1, Starksboro, Vt.
Read, ArthurCabot, Vt.
Roberts, R. H.....Chelsea, Vt.
Rounds, W. D.....Wilmington, Vt.
Remick, H. E.,
R. F. D. 1, St. Johnsbury, Vt.
Ranney, FrankConcord, Vt.
Roy, Henry G.....West Barnet, Vt.

S

Salmon, N. K. & Arthur..Glover, Vt.
Sanders, B. E.....Barre, Vt.
Saxby, E. H.....Marshfield, Vt.
Shattuck, D. A. & Son,
Londonderry, Vt.
Shattuck, H. W.....Eden, Vt.
Shattuck, R. L.....Eden, Vt.
Schayltz, L. Jos.....Eden, Vt.
Schillhammer, Carl R...Jericho, Vt.
Scribner, H. F.....Plainfield, Vt.
Scott, C. G.....Newport, Vt.
Shepard, W. F.....Barre, Vt.
Sherlaw, Edward C.,
Newport Ctr., Vt.
Shine, Edwin W.,
South Londonderry, Vt.
Simonds, E. C.....Peru, Vt.
Simpson, A.Perkinsville, Vt.
Simpson, W. Arthur,
Lyndonville, Vt.
Sleeper, J. S.....Vershire, Vt.

Small Bros. Manufacturing Co.,
Richford, Vt.
Small, F. H.....Huntington, Vt.
Smith, Alvin H.....Danby, Vt.
Smith, OlsonPlainfield, Vt.
Smith, A. J.....Barton, Vt.
Smith, AllenCabot, Vt.
Smith, Clarence F.....Peru, Vt.
Soule, George H.....Fairfield, Vt.
Spaulding, R. A.,
West Charlestown, Vt.
Spaulding, Willis L.,
Proctorsville, Vt.
Spear, Charles L.,
West Newbury, Vt.
Spear, F. F.....West Newbury, Vt.
Spear, Mrs. J. P.,
West Newbury, Vt.
Spear, J. P.....West Newbury, Vt.
Spear, Mrs. R. N.,
West Newbury, Vt.
Spear, V. I.....Randolph, Vt.
Sprague, Geo. K.,
Randolph Centre, Vt.
Squires, H. C. & Son..Newport, Vt.
Stearns, Collins ...Perkinsville, Vt.
Stevens, S. J...West Newbury, Vt.
Stebbins, E. W.....Cambridge, Vt.
Stewart, Floyd E...Eden Mills, Vt.
Stiles, R. G.....West Glover, Vt.
Stoddard, Price A.....Andover, Vt.
Stone, Mason S.....Montpelier, Vt.
Stone, O. B.....Eden Mills, Vt.
Storey, G. E.....Burlington, Vt.
Story & Hicks.....Essex Jct., Vt.
Story, L. L.....East Fairfield, Vt.
Strawn, N. W.....Orleans, Vt.
Strong, Fred W.....Montpelier, Vt.
Strong, S. H.Moretown, Vt.
Swan, P. B.....Montgomery, Vt.
Swanton, F. V.,
Orleans, R. D. 1, Vt.
Sweeton, A. W.....Brattleboro, Vt.
Sykes, AureliusHinesburg, Vt.
Sweet, D. W.,
Phillips, R. D. 2, Maine
Sargent, P. D.....Chelsea, Vt.
Spear, E. F.....Chelsea, Vt.
Sawyer, A. E.....Whiting, Vt.
Slocum, Clarence A...Brandon, Vt.
Smith, G. H...North Clarendon, Vt.
Stone, W. C...East Wallingford, Vt.
Shattuck, Homer C.,
St. Johnsbury, Vt.
Soloman, Chas. T....Ashland, Mass.
Smith, M. H.,
South Londonderry, Vt.
Shoreham, E. M.....Fairfax, Vt.

Smith, J. H. West Bolton, Vt.
Shedd, M. E. Fairfax, Vt.
Sherburne, B. R.,
R. F. D. 1, Glover, Vt.

T

Tabor, H. S. Montpelier, Vt.
Taft, C. E.,
R. F. D. 5, Brattleboro, Vt.
Taft, John Brattleboro, Vt.
Tanner, H. E. Marshfield, Vt.
Teer, Frank West Rutland, Vt.
Tenney, E. C. Mgr.,
Scott Farm,

Brattleboro, Vt.

Thomas, R. B. Gullford, Vt.
Thompson, J. Edward,

Landgrove, Vt.

Thompson, J. F. East Corinth, Vt.
Thorburn, Andrew Norwich, Vt.
Thurber, N. E. West Halifax, Vt.
Tietz, Wm. Richmond, Vt.
Tift, Edgar F. Dorset, Vt.
True, W. W. Newport, Vt.
Tuller, Fred V. Tunbridge, Vt.
Turner, T. A. Weston, Vt.
Tuxbury, W. H. West Newbury, Vt.
Taylor, Chas W. Concord, Vt.
Tracy, O. D. Chelsea, Vt.

V

Vail, Homer W. Randolph, Vt.
Vt. Farm Machine Co.,
Bellows Falls, Vt.

W

Wade, A. P. Moretown, Vt.
Walbridge, Mrs. E. P. Cabot, Vt.
Walbridge, E. P. Cabot, Vt.
Walbridge, Earl M. Marshfield, Vt.
Walbridge, F. M. Cabot, Vt.
Walbridge, Maurice Cabot, Vt.
Walker, B. J. West Rutland, Vt.
Walker, H. I. Weston, Vt.
Walker, Lewis M. Weston, Vt.
Walter, E. N. East Haven, Vt.
Warner, G. F. Chester Depot, Vt.
Washington Co. Farm Bureau,

Montpelier, Vt.

Waterhouse, C. E. Craftsbury, Vt.
Watson, Chas. Derby, Vt.
Waite, A. H. Morrisville, Vt.
Weeks, A. B. Stowe, Vt.

Wells, Leon Bakersfield, Vt.
West, Ernest H. Dorset, Vt.
Wetherby, E. G. Danby, Vt.
Wetherby, Omar M. Danby, Vt.
Walker, M. Montpelier, Vt.
Wheaton, Charles. Passumpsic, Vt.
Whitehill, E. M. Derby, Vt.
White, Enos R. West Rutland, Vt.
Whitcher, J. R. Groton, Vt.
Wilber, Frank Rochester, Vt.
Wilber, Seth Moretown, Vt.
Wilbur, B. L.,

North Montpelier, Vt.

Wilcox, F. H. East Brookfield, Vt.
Wilden, L. O. Middlesex, Vt.
Winn, S. E.,

West Chesterfield, N. H.

Wood, Geo. M. Waterbury, Vt.
Woodruff, W. S. & Son,

Cambridge, Vt.

Wright, Arthur

Bradford, R. D. 2, Vt.

Wright, W. J. Montgomery Ctr., Vt.
Wright, Carlos & Son,

Bradford, Vt.

Wyman, Ned W. Cambridge, Vt.
Wheelock, C. H. Bakersfield, Vt.
Whitney, Ernest L. East Dorset, Vt.
Wheeler, A. H. Cabot, Vt.
Walbridge, R. B. & E. O.,

Cabot, Vt.

Walker, W. C. Cabot, Vt.
Wildon, S. C. Chelsea, Vt.
Warren Bros. Proctorsville, Vt.
Whitehill, Nelson Peacham, Vt.
Williams, B. J. Williamstown, Vt.
Wilkins, Glenn A. Morrisville, Vt.
Williams, B. J. & Son,

Morgan Center, Vt.

Wilkins, A. R. Fairfax, Vt.
West, Charles E.,

North Troy, R. D. 2, Vt.

Wheeler, Clarence Cabot, Vt.
Williams, E. J. & Son,

Lower Waterford, Vt.

Weed, B. W. St. Albans, Vt.

Y

Younge, Harry A.,

West Danville, Vt.

Younge, E. M. Chelsea, Vt.
York, William E.,

Bristol, R. D. 4, Vt.

Young, J. Orleans, R. D. 4, Vt.



REPORT
OF THE
Twenty-ninth Annual Convention
OF THE
VERMONT
Maple Sugar Makers' Association
HELD AT
University of Vermont Gymnasium
BURLINGTON, VERMONT
January 10, 11, 12, 1922



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1922

**OFFICERS OF THE VERMONT MAPLE SUGARMAKERS'
ASSOCIATION.**

PRESIDENT.

C. F. MORAN **Jericho**

VICE PRESIDENTS.

E. E. PERLEY **Richford**

GLENN WILKINS **Morrisville**

SECRETARY.

M. J. CORLISS **Montpelier**

TREASURER.

L. L. STORY **East Fairfield**

AUDITOR.

GUY H. TIFFANY **East Berkshire**

PROCEEDINGS
OF THE
Twenty-ninth Annual Meeting
OF THE
VERMONT
Maple Sugar Makers' Association

THE GYMNASIUM, UNIVERSITY OF VERMONT,
BURLINGTON, VERMONT, January 10, 11, 12, 1922.

The 29th Annual Meeting of the Vermont Sugarmakers' Association convened at 2 o'clock, January 10th. President Badger presided. Rev. C. C. Adams, pastor of the First Church offered the invocation. Mayor J. Holmes Jackson welcomed the joint meeting of the dairymen and sugar-makers in the following words:

Burlington is again honored by this joint meeting of your associations in our city. We welcome you as organized bodies seeking to promote the industries here represented, and we welcome you as individuals having at heart the welfare of the State. Whatever tends to prosper your labors, also tends to prosper the State. This State is small in area, but it is forward-looking in its purposes, and from the day of the Green Mountain Boys at Ticonderoga until now, Vermont has ever proved her steadfast loyalty to the free institutions of our Republic. But you are here today not to study Statecraft; rather to consider how best you can further the worthy objects of your societies by increasing your output at the least reasonable cost. As farmers you are primarily interested in the activities of your several industries. These industries, well directed, and operated on an economic and efficient basis, increase your own prosperity and add to the wealth of the State. The successful dairymen brings to his financial aid the profits of the sugar orchard, if he owns or controls one. The wise farmer does not let his tillable and pasture land to be overgrown with brush, nor does he sell his sugar trees to make hard wood flooring. No natural or acquired industry should be made to suffer for temporary gain. The State largely depends upon the farmers for its permanent prosperity. It is essential to our greatest prosperity that every acre

of tillable land should be so cultivated as to produce the largest returns possible, consistent with good husbandry, and that every maple sugar tree should be preserved and all young maple trees giving promise of becoming producers of maple sugar be carefully nursed. You farmers have it largely in your hands to add to the prosperity of all our people, producers and consumers, and also to add to the prestige of the State.

I hope you each and all will have a most profitable meeting; and now, as Mayor of this city, which shall be for the time you are here, also your city, and on behalf of all our inhabitants, I bid you a most hearty welcome.

C. A. Purington of Burlington responded for the sugar makers. He said:

It gives me great pleasure to respond to the gracious words of welcome the mayor of this city has extended to us, and wish to assure you and the citizens of Burlington that the sugarmakers are grateful to you for the facilities that you offer for these conventions. As you have so aptly said, each one is looking to the benefit of the State, and whatever will tend to promote the interests of the State, the prosperity of the farm or the sugarmaking or dairying, goes to augment the prosperity of every citizen of the State. As we sit here today we can look back over a year of great difficulties. As we sat here a year ago we were just entering on that period of readjustment. Today the great financiers of the nation tell us we are nearing the end of that period. We are looking back on that period of difficulties, and we can look forward to a period of greater prosperity. As far as the sugarmakers are concerned I believe we are standing upon the threshold of new things. I have every reason to believe that with the work that officers and committees of this association have put in this year in promoting cooperative marketing, which is going to be the great feature of this meeting, we have opened a new door to prosperity in this association and among the sugarmakers of the State, and I appeal to you at this opening session to co-operate thoroughly and heartily in this movement to make a greater prosperity for the sugar producers in the State. I believe, as I said, we are opening a new door of prosperity in this industry and we can look forward not as we did last year to a season of depression but to prosperity and steady growth, and if we all work conscientiously and honestly for this purpose, I believe when we stand in convention assembled next year we shall have great rejoicing as to the progress that has been made during the year we are now entering upon.

SECRETARY'S REPORT.

Mr. President, Members of the Vermont Maple Sugar-makers' Association, Ladies and Gentlemen:

As we pause for a little time to review the works of the Maple Sugarmakers' Association and the sugar industry of the State of Vermont, a few points stand out so prominently that we may well consider them.

The officers of your association have cooperated with the extension service and the department of agriculture, endeavoring to advance the interests of the maple product whenever possible. First, the committee that was appointed one year ago today to study and investigate the maple product industry, with organized marketing as their goal, has worked faithfully and have met the producers once at Montpelier and once at Burlington in state-wide meetings to obtain the producers' views upon special points. They also met the New York committee in joint meeting at Burlington, and have given unsparingly of their time, and to-night will present to you their findings for a state-wide policy. We have cooperated with many of the county fair associations and with the State fair, with the result of larger and more successful sales and exhibits. At our Vermont fairs, hundreds of orders have been taken, and the product will go into other states,—this we believe making the best kind of advertising. In corporation with the department of agriculture at the Eastern States Exposition at Springfield, Mass., we put on the largest and most successful sale we have ever held, making an increase of 30 percent in the amount of maple products disposed of. Many dealers have told me that their business was materially increased by the sale and exhibit that we put on at Springfield. This kind of sale and exhibit should be extended to other agricultural exhibitions. Two successful exhibits were put on at Hartford, Conn., with the Connecticut Horticultural and Industrial Exposition, and with the Hartford Automobile show. To me it seems the year 1921 marks a new era in the maple sugar industry, and it will prove to be one of great profit to the producers of Vermont. You may cry "Where the profit?" when a large percentage of sugar and syrup was sold at one-half what it cost to produce it. Yes, but the value comes in the lessons it has taught us: i. e. You must produce a better quality of maple products. Seventy-five percent of your products must be standard No.

1, and it can be done with very little added effort. First, you must have proper equipment; second, keep it clean and sanitary; third, a thorough knowledge of how to use it and handle your product. Number 1 quality will find a ready market at a price well above the cost of producing. I believe that a profitable market for black, low grade sugar has gone, never to return, but a rapidly increasing market for good quality is before you with profit for the producer.

The second great truth that the past year has taught us, is the need of organization and cooperation among the producers. This will be the main thought of this annual meeting, and when you leave we trust you will be in the right frame of mind to cooperate with your forces at home to make a better product; also to trust and cooperate with your neighbor producer in selling your product.

In order to convey to you through the inquiries that come to your Secretary, what some of your problems are, and also what many producers think of the maple sugar industry, I wish to read to you extracts from a few of the many letters I have received:

"Mrs Coolidge and I wish to express our sincerest thanks for your courtesy to us and for the box of delicious maple sugar cakes that we have received. We are deeply appreciative of your friendly feeling.

Very truly yours,

CALVIN COOLIDGE."

From Minnesota:

"Will you please send to our school any booklets, pamphlets or samples of maple sugar?"

From New Jersey:

"I am thinking of engaging in the grocery business. I have a number of prospective customers for maple syrup in gallon or quart cans. I want to get the best made. Please quote me prices on orders."

"I have several deserving young men in my school now who are most anxious to make a little money. I believe I could help them do so by taking orders for a high grade maple syrup,—something we cannot get very well here. All is more or less adulterated."

From Arizona:

"I am asking you for information regarding the process followed in producing maple sugar and syrup. A bulletin or a brief outline would be sufficient. I am

asking this information for the reason that we are strong for the purest and most vital foods, knowing that most prepared foods on the market are so highly refined as to be devitalized or chemically unfit for food."

From Orange County:

"I would say that I have long felt that the Association should take hold of the marketing end of the maple sugar business. When I see Karo "with the maple flavor" advertised so extensively, as well as other "maple flavor" syrups; when I read of an association of fruit growers in Oregon placing a contract for a year's advertising of their products in the New York subways, and doing a business amounting to \$2,500,000. during the first year of their organization, then I wonder what is the matter with Vermont farmers in general, and the maple sugar makers in particular with products of high quality on their hands which they cannot market. I firmly believe that, with proper advertising, grading and marketing under some cooperative system, at the cost of a small assessment per pound of sugar, all of the first quality out-put of maple sugar and syrup in the State would find a ready market at a profitable price. I am only a small producer,—four hundred trees is my limit, but I am willing to do what I can to help the Association in improving conditions."

From Orleans County:

"Could you give me the names of firms handling syrup cans and pails, and what do you think would be the best selling size for sugar cakes?"

From the Boston TRANSCRIPT:

"If entirely convenient, will you send us a list of a few of the principal maple syrup producers in the states of New Hampshire and Vermont? We mean such people as a commission house in the Philippine Islands would write to for shipments?"

Another:

"Am anxious to get information regarding maple sugar Am in the market to buy. Want to know how it is made. What is the best locality, dealers and makers' address. If you have any bulletins or reports you can send me, would be glad to hear from you."

Orange County:

"Your card was received and I regret not to be able to attend the meeting. I certainly believe that it is

time that the producers of maple syrup handle their product to a better advantage to themselves. Producers of fruit and vegetables on the Pacific Coast are able to market their products in all eastern cities to good advantage. The Southern states are doing the same. Maple syrup is a luxury and it costs a good deal to produce it,—that is a high grade,—and it should be sold at a high price. A great many hotels are putting on their bill of fare cheap molasses with a very little maple srup in it. If a few were prosecuted and publicity given, it would stop that business."

Orleans County :

"I have had a call for maple cream and do not know how to make it. Can you give me information about it or tell me where I can get it? Have sent sugar to 12 or 15 states in the last three months and would like to be up-to-date in preparing it for market."

Orange County :

"This is the year and now is the time for the Vermont Maple Sugarmakers Association to prove to the producers of Vermont whether such an organization is of any benefit or not. Most of the sugar makers in this section are determined to hold for better prices than dealers are now offering. If the Vermont Maple Sugarmakers' Association can do us any good we are ready to be shown."

Windsor county :

"It seems to me in these days of large cooperative enterprises we should have an organization that will grade and market our sugar. Let's have an organization that amounts to something, like the fruit growers, potato growers and milk producers, then the producers will improve their product because they will have to get the price. At present 90 per cent. have no incentive to improve their quality the way it is marketed."

Lamoille County :

Rutland County:

"As it now is the majority of sugar and syrup on the market goes under the name of Vermont. If by standardizing and improving our product, then protecting our name, we should be able to furnish an article which put out under our label would bring more money than it does to-day."

This letter from a girl 15 years of age, Caledonia county:

"The Association should take every opportunity to make the sugar clean. My father, after getting his new sugar rig, made 50% better sugar because he took particular pains in cleaning his vats, etc. every night when the sugar was drawn out. His sap was strained through two thicknesses of cheese cloth besides the modern galvanized strainer on the drawing vat. Then it went through a cheese cloth bag at the end of the pipe when it went to the storage tank. It again was put through a strainer when it was drawn into the boiler. Even then it was not absolutely clean but much dirt was taken from it by boiling a quantity of milk with it when sugaring or syruping off. The scum should be taken off when boiling, with a sugar skimmer. There will still be some left to go into the felt strainer which strains the syrup and cleans it thoroughly. These cheesecloth bags and strainers must be cleaned every day or they will sour and be by no means sanitary. This is just a few of the things I learned while helping my father sugar. Hoping this will help the Association members, I am,

Yours respectfully."

Another:

"I am a business man and make syrup and sugar at my country home. We try to turn out a good product and to support all good local and state organizations. Even though I can't attend these meetings in person, yet if at any time you should need contributions to any special fund, for work looking toward future improvement in manufacturing, I'll be *glad* to do my share."

Problems similar to ours have been met in a large measure by the organization of farmer cooperative societies,—not a society to arbitrarily fix prices, but a society to study the demand and instead of throwing the entire season's crop upon the market within a few weeks, let us provide for orderly marketing of our products.

On motion the secretary's report was accepted and adopted.

PRESIDENT'S ADDRESS.

Ladies and Gentlemen, Members of the Vermont Maple Sugar Makers Association:

It is a great pleasure to me to meet with you here at Burlington, the Queen City of the State of Vermont, for our Twenty-ninth Annual meeting. It always gives me great pleasure to meet with the different Farmers' Organizations on this hill, even the air is charged with so much knowledge that you cannot get away without absorbing a large amount of it and go away feeling a little larger and a little broader man than when you came. I don't think everyone realizes what Professor Bradlee has done for the betterment of agriculture in the State of Vermont in the last few years he has been a great help to the farmers all along the line. Of course we all know what Dean Hills has been to Vermont, having spent practically his whole busy life with us.

Now my talk to you today will be more in the form of a lecture than of an address, as I think a lecture at this time is what you most need. There have been a great many changes in the maple sugar industry in the past twenty-nine years but at no time has there been such a sudden change as there has been in the past year the market conditions have changed all around. The demand to-day calls mostly for a very nice grade of goods and will not be satisfied with anything else.

Now it is up to us as producers to supply this demand and how are we going at it? It seems to me as though when there is a dollar a gallon premium in favor of the No. 1 syrup over the No. 2 grade and a larger demand for the better quality that we had better get busy and supply this demand now. I find a great many producers that really don't know how to produce a first class quality of maple syrup and am going to try and tell you what you ought to do and what you ought not to do to bring this about. You will have to break the roads, wallow through the deep snow and tap the trees, gather the sap, furnish the wood and do all the hard, heavy work anyway, furnish all utensils, whether you make a good or a poor article, so let's be a little fussy and make the best.

In the first place every thing should be perfectly clean and kept clean. A little sour sap spoils the whole thing. Sap should be boiled as quickly as possible after it leaves the trees, to a syrup that will weigh 11 1-4 lbs. to the

gallon. Strained through a cotton flannel strainer to take out all dirt and niter, and don't for the love of Mike mix your hot syrup with the cold at any time. If you do you will get a syrup that will not keep well. While a syrup that weighs 11 lbs. to the gallon is all right in the spring when it is fresh, eight times out of ten it will be turned before fall and oftentimes this heavier syrup will outsell the lighter weight from fifty cents to one dollar per gallon.

When you have succeeded in making a nice syrup then put it up right, whether in barrels, cans or bottles, fill them full, leave them uncapped for two or three hours and let all air work its way out and then refill and put the cap on tight. You can't keep syrup and air in the same can or barrel at the same time and have it keep well for very long. Put up your syrup cold, keep out all air and I will warrant it to keep sweet one year or five, if you do not open it up. If you have to open up a can or barrel, use it all up as soon as possible, or put a part of it in smaller jars but keep the air away from it.

Now, if we have nice syrup we can very easily make nice sugar and as a large part of our maple products are sold in the summer and fall in the way of tin pails, cakes, cream and candies, these should be made up fresh as wanted. Maple sugar put up in tin pails won't keep fresh very long and in cakes and candies, but a few days. I would advise putting up the heft of the crop in steel barrels. Should prefer the thirty gallon barrel. Why prefer the thirty gallon barrel? Because sometimes you could fill the thirty gallon of nice syrup when you could not fill the fifty-five gallon barrel with that class of goods and the thirty gallon barrel is easier to handle. The Association can furnish you with cans or barrels of a good quality and at a fair price.

I never saw the outlook brighter for a good market of the maple products at a good price than at the present time. We have quite a lot of orders on hand for next season's crop. We have practically set the price for maple syrup for the coming year: No. 1 at \$1.75 per gallon; No. 2 at .75 per gallon; No. 3, no price, as there is no market for this class of goods. If you haven't got an equipment that you can make a good quality of syrup with, I should advise you getting one right away and be sure that you get covers for your buckets as they will save their cost the first year.

I believe that in two years time those farmers that have sold or cut off their sugar orchards will be sorry, as the farm that has a good maple grove on it will be held at a premium and will be considered as one of the best assets of

the farm. Did you ever consider what an asset to the value of your farm if you had a row of maple trees each side of the road on your place? This is not only possible but profitable and I believe that the State Forestry department and the State highway department will be willing to help you bring this about. Mr. Hastings, our State Forester will have something to say along these lines.

At our last annual meeting you took a vote to have your officers put on a sale and exhibit at Springfield, Mass. and our State Fair and other county fairs. We have done so and our nicest exhibit was at St. Johnsbury. We had the nicest place and the best goods to do this with at St. Johnsbury. We put on an exhibit and sale at Rutland. We had a new building there but a rather poor quality of goods.

We put on an exhibit and sale at Springfield, Mass. in cooperation with the agricultural department and manufactured about 2,700 lbs. of sugar cakes in the six days and we had an exhibit and sale at the State Fair, White River Junction.

Now this is mighty good advertising for the maple products of Vermont, but it means a lot of hard work for some one and quite an expense and who do you expect is going to pay the bills? I would recommend that you continue to carry out and extend these Fair exhibits and sales on a larger scale and do so within your own Association and have the credit and publicity of doing it. You will never get anywhere as an Association by mixing in with the State on an affair of this kind. We have a marketing committee formed that will have a program mapped out for your consideration at this time.

I would recommend that you try and be present and learn what your marketing and grading committees have to offer. It is absolutely necessary that the maple products of Vermont should be graded before they are put on the market.

I would recommend that your Association should hire a man sized man the year round to look after your interests in the way of buying equipments and marketing your goods. You cannot all come to Burlington, but you can have a man go to the different localities to inform you what is going on.

The election of officers resulted as follows, Messrs. Hoskinson and Maxham acting as tellers:

PRESIDENTC. F. MORAN, Jericho
 VICE PRESIDENTS.....E. E. PERLEY, Richford
GLENN WILKINS, Morrisville

SECRETARY.....M. J. CORLISS, Montpelier
TREASURER.....L. L. STOREY, East Fairfield
AUDITOR.....GUY H. TIFFANY, East Berkshire

The following were appointed a Committee on Resolutions:

PROFESSOR BRADLEE, of Burlington, G. H. RUMNEY, of Middlesex, IRVING KIRK, of South Wallingford.

A rising vote of thanks was given the retiring president.

TUESDAY EVENING SESSION.

The evening session and annual banquet of the sugar-makers was held at the New Sherwood Hotel. The McKay plan of cooperative marketing for the maple products of Vermont absorbed the discussion that followed the banquet, which was held at seven o'clock. A. W. McKay of the Bureau of Markets, U. S. Department of Agriculture, who has been in Vermont for some time gathering data for a workable cooperative system, is the father of a plan approved by the marketing committee of the Association. The McKay marketing plan is as follows:

The basis of the organization will be local associations of producers grouped around a convenient shipping point, to act as units for disseminating market information among its members and other data of interest. The local association will act as an assembling and shipping unit for maple products of the members in that locality, by the secretary or manager of the local association, who will ship products at the direction of the manager of the central organization.

Capital stock of a local association should be at least \$2,500 and the unit should be incorporated. Par value of shares are placed at \$10 each, the minimum requirement for membership in the unit. No member can hold more than ten per cent of the stock, and dividends are restricted to six per cent. A crop contract is to exist between a local association and its members, who agree to lend the association upon demand, the equivalent of five cents per spout driven last season on the farm now occupied. Certificates of indebtedness will be issued in acknowledgment of the loan, which will be used by the local units to purchase the common stock of the central exchange.

Each member in the local association is entitled to one vote, only, regardless of stock owned, and directors will be elected, who in turn will elect the officers of the association. The local association will also elect a director to represent them upon the board of the central exchange.

The central organization, to be called the Vermont Maple Production Exchange, is to be organized under the incorporation of cooperative associations section of state law. Local associations will own the common stock of the Exchange and absolutely control its policy. The board of directors of the Exchange are to elect from their members an executive committee, charged with business supervision of the Exchange. This executive committee will elect the officers of the Exchange and a manager to have direct charge of its proceedings and marketing activities.

It is assumed that the Exchange for the first year or so of its operation will contract with an established manufacturer, bonded to act as warehouseman, to process and can their pure syrup.

President Moran presided at the meeting. Commissioner of Agriculture Brigham addressed the audience, and urged the adoption of the cooperative marketing plan. Mr. McKay illustrated his plan with the aid of graphic charts exhibited at the meeting. Much discussion followed the presentation of the plan and at 11 o'clock when the meeting closed, it was decided to hold over final consideration of the plan until the following evening meeting, to allow of free discussion of the project.

WEDNESDAY MORNING SESSION.

H. N. Davis, Deputy Commissioner of the Department of Weights and Measures of Vermont, spoke briefly but earnestly regarding the necessity of a strict compliance with the law concerning weights and measures. He said, in part:

"Vermont maple sugar and syrup are the pride of our State. Every true Vermonter desires this well-known product to be above criticism in every way wherever found. The legislature of 1919 passed a net weight law which requires an expression of net weight on the packages of all articles of food. The interests of your business and your State demand that you comply with the law by having the net weight or measure marked on all packages of sugar or syrup marketed by you."

COOPERATIVE MARKETING OF MAPLE SAP PRODUCTS.

BY A. W. MCKAY.

Bureau of Markets and Crop Estimates, WASHINGTON, D. C.

I have recently read with a great deal of interest the proceedings of some of the early meetings of this Society. From the inception of the Vermont Maple Sugar Makers' Association the marketing of maple sap products by the producers has been a lively topic of discussion. It appears that the producers are now ready to take definite, concerted action to market at least a portion of their products for their own account. Inasmuch as the title of my paper gives me considerable latitude, I intend to avoid details of organization management and sales methods and confine myself to what appear to me to be the fundamental principles of cooperation,—the foundation that must be laid before a successful cooperative organization can be built.

First of all, what is a cooperative association? The producer is greatly interested in cooperation at the present time. All over the United States a great many people are engaged in evolving and presenting plans and formulae which they believe will solve the farmers' marketing problems. There is a feverish, almost 'evangelistic' activity in the promotion of cooperative marketing organizations. I do not wish to belittle this movement in any way, but simply wish to point out that we must approach this problem in a business-like manner, and with a clear understanding of all the factors involved. We should remember that we very seldom get something for nothing, and that our rewards as producers will continue to bear a direct relation to our efforts.

A cooperative association has been defined by a well known authority in the following words: "A cooperative association is one in which the members form an agency through which they conduct their own business for their greatest mutual advantage. To be cooperative it must be formed of producers exclusively and managed by them, and the benefits must be returned to them in proportion to the patronage of each. The capital necessary to create the agency and its facilities should be contributed by the members in proportion to the use which each makes of it."

First of all, a cooperative association must be the result

of economic necessity, and the necessity must be sufficiently urgent to convince the producers that their salvation lies in working together as a unit for the welfare of the whole industry. It is not easy for a man to merge his interests with those of his neighbors. He often feels that he is sacrificing his independence, or that he is surrendering some personal economic advantage for the benefit of others. Therefore, the economic necessity must be strong enough to make him forget individual considerations, and think in terms of the welfare of the group which he represents. There must be pressing problems of distribution, of marketing, of excessive freight rates, or high overhead costs, which he cannot solve alone, and which materially affect the returns he receives for his products. An organization founded upon enthusiasm, or persuasion, or anything except economic necessity will not survive very long. It may be perfect in plan and form, but when the enthusiasm subsides, it will fall by the wayside.

Most of the successful cooperative associations of this country have started in a small way, attempting at first the solution of only a few of the most pressing economic problems confronting their industry. Then as their membership and management gained experience, they have gone on step by step, and developed their organization to the extent necessary to fully meet their requirements.

As the producer develops his own marketing organization, there comes to him a better understanding of marketing problems, and perhaps more respect for that class of men, known as middlemen, who stand between him and the consumer.

Some time ago a cartoon appeared in the "Country Gentlemen" which has aroused considerable comment. There were three pictures. On the left, the farmer was shown selling his potatoes for \$1.00 a bushel. Then in the center there was a totally black space, and on the right the city consumer was depicted paying \$2.00 a bushel for the same potatoes the farmer had sold for \$1.00 a bushel. The title of the cartoon was, "What happens in the dark?" Now, "What happens in the dark" is thoroughly understood. Services have been performed, and these services must be paid for.

The potatoes were assembled by a local dealer, or a local association. They were graded, packed, loaded in a freight car and transported to market. The car of potatoes was received by a wholesaler who broke up the shipment into small lots and resold it to several other dealers. The potatoes were hauled to the stores of several retailers, and

finally delivered in five or ten pound lots to the homes of hundreds, or thousands of consumers scattered over a large city. All these services must be paid for, and what became of the additional dollar paid by the consumer is no mystery. The problem of marketing is not to determine "What happens in the dark," but to unify and systematize the performance of middleman services so that the largest possible percentage of the consumer's dollar reaches the producer.

This problem will exist whether products are marketed cooperatively or not. Someone must assemble potatoes, and maple syrup, into large lots. Someone must prepare them for market, grade, pack, transport, sell and store them, and finance their sale and distribution. There is no miracle through which these services can be performed without cost.

It must be evident that cooperative marketing is only helpful in so far as it reduces the cost of performing these services. It is not an end in itself, and whether the producer markets his own products or employs other agencies to perform these services for him must depend upon the relative economic value of the two methods. This brings us back to the original statement that a cooperative organization must be founded upon a definite economic necessity and must perform a definite economic service.

As a second principle, a cooperative marketing organization must be composed exclusively of producers. All the capital must be furnished, and all the work must be done by the producers for their mutual benefit. Organizations that are not composed entirely of producers have in them conflicting elements which create discord. Cooperative associations are organized to serve the interests of the producers. When other interests have a part in their management, the producers feel, perhaps rightly, that their interests are not getting first consideration, and the association is in danger of disruption. I do not except from this class associations organized and financed by public spirited men for the benefit of the producers.

The successful cooperative organizations are those which are composed of groups of men having similar problems, and working for the same objects. It does not matter how small their beginning may be. If they are built out of the needs of the industry, the chances are that they will succeed. A group of producers working together, meeting their own problems, as they arise, gain along with their business experience a loyalty to each other and their organization which they can obtain in no other way. They are true cooperators. They are not weakened by adverse

conditions, or by the efforts of those to whose interest it is to break up their organizations.

A cooperative organization differs from an ordinary stock company in that men and not money are the basis of the institution. In a company organized for profit, the capital contributions are the important factor, and voting power is made proportional to the amount of capital invested. In a cooperative association, however, it cannot be said that any one man's interest is greater than another's. The small producer is just as much interested in securing a fair price for his products as is the large producer. Each member, therefore, should have an equal voice in the management of the association. This is provided in the Vermont laws. So it is unnecessary to discuss it further than to point out that one-man one-vote is a fundamentally sound principle, which promotes a feeling of mutual confidence among the members of a cooperative organization. Of course, it goes without saying that any profit or surplus on hand at the end of the season should be distributed among the members in proportion to the amount of their sales or other uses which they have made of the organization.

Another fundamental principle of a cooperative organization is that it must center around a commodity. It is quite possible for our organization to handle successfully several commodities that are harvested and prepared for market in much the same way, and sold through the same channels. For example, the different kinds of truck crops might be handled successfully by a single organization. When you get such widely diverse products as fruit and cotton, or maple sirup and potatoes, however, students of the subject are agreed that separate organizations must be established for each on account of the great variation in production, harvesting and marketing methods employed.

Finally, to be successful a cooperative organization must be founded upon local units. It must be based upon men who are neighbors, who know each other, have the same problems and have confidence in each other. Then, for business convenience, these local units can be federated into a central selling organization. Unless a man is close to his organization, unless he can see it operate locally, and has a direct knowledge of the way in which its affairs are being conducted, he is apt to feel that the organization has been created *for* him, not *of* him. There is then a danger that the organization will go to pieces in times of adversity. Unless a man has a share in the direction of his organization, his first thought, when unfavorable con-

ditions arise, is to find a scapegoat,—someone to shoulder the blame,—and the central organization meets the requirements in every case.

On the other hand, the man who is part of a local unit, and who has a part in shaping its policies, understands conditions. He is loyal to the institution because he is a part of it, and he feels that, although mistakes may be made and unfavorable conditions arise, he is at the same time conducting his business through his own agency for the benefit of himself and his fellow members.

On this subject I would like to quote G. Harold Powell, General Manager of the California Fruit Growers' Exchange. The California Fruit Growers' Exchange, as you probably know, is the outstanding example in this country of a successful cooperative marketing organization. It began almost thirty years ago with a small group of growers who shipped 21 cars of oranges cooperatively their first season. Last year the Exchange shipped over 40,000 cars of oranges and lemons, and distributed \$63,000,000 to its members. Mr. Powell says:—

"I am a great believer, personally, that an organization must be formed from the social standpoint as well as the business standpoint. Any organization formed in that way is contrasted to the State-wide corporations which are being formed for farmer purposes, and in which each man is a stockholder, but in which he has no local, vital breathing contact. The men who consider it from that standpoint look at it purely from a business standpoint, and they miss that spark within the individual which makes him a permanent cooperator. They approach it purely as a steel trust, a standard oil company, or any other great business, just as a stock corporation would approach a problem. That, of course, is one way to handle it, but the farmer problem is a human problem, and, therefore, I think that in the case of all these great State-wide organizations that are being formed it will take ten years to measure the success of any one of them; at least ten years of ups and downs; and I think the further these organizations get away from the individuals the greater the liability of disaster over a period of years under adverse conditions."

I have said quite a little about cooperation, and very little about maple sirup. It seemed to me desirable first of all to bring out the principles upon which a cooperative organization must be established before attempting to discuss the marketing of maple sap products cooperatively. Let us apply the test principle of economic necessity to the

situation in Vermont. Is there any economic necessity for the organization of a cooperative marketing association for Vermont maple sap product? Most of you, having in mind the low prices paid for sirup and sugar last season, will immediately answer, "Yes." However, that does not fully answer the question. You must admit that prices were good in 1920, and of course we are not certain that you would have fared any better than you did with cooperative marketing in 1921.

Here is what seems to me to be the weak point in your present system. In 1860 the population of the United States was a little over 31,000,000. In that year, there were 52,000,000 pounds of maple sugar, and sirup expressed in terms of sugar, produced in the United States, and we can assume that the greater part of it was consumed in this country. Last year with a population of over 100,000,000, great difficulty was experienced in marketing a crop of less than 26,000,000 pounds; only a portion of which went on the market as a pure product. It would, therefore, be conservative to say that the per capita consumption of maple sugar and sirup is less than a fourth as large today as it was in 1860.

On the other hand, the consumption of sweets of all kinds has steadily increased. In 1877, each person in the United States consumed on the average 36 pounds of sugar (sugar of all kinds), while in 1920, the per capita consumption of sugar was 91.5 pounds. In spite of the fact that population has increased three and one-half times since 1860, and the average amount of sugar consumed by each person has increased two and one-half times since 1877, the greater part of the maple sap products must be sold in bulk at the present time for flavoring purposes at what it is claimed are disastrous prices. Blended sirups of various kinds have filled the demand created by increased population and increased consumption, but the pure maple sirup and sugar business has actually declined in quantity, and to a much larger extent in the amount consumed per capita.

What is the reason? Everyone who knows good quality pure Vermont maple sirup will not admit for a moment that there is anything wrong with the product. Your method of marketing, therefore, must be at fault.

It seems to me that the answer is simply this: while you were depending upon the fine quality of your maple sugar and sirup to advertise itself to the consumers, the manufacturers of blended sirups have been conducting an aggressive campaign to educate the consumers to use their

goods. They have had some points in their favor. Their product is standard in grade and quality. The dealers and the consumers know that each lot they buy will be exactly like the last. Their goods are put up in standard packages and under standard brands, and they have used every medium of publicity to attract the attention of the consumers. It is not surprising that their business has increased and it is not surprising that the pure sirup business has declined.

I believe, therefore, that it is necessary for the Vermont producers to organize to do for themselves some of the things that the manufacturers of blended sirup have done for their business. There are four problems which appear to me immediately important. These can not be solved by the producers as individuals, but they can be solved by an organization of producers. These problems are:

1. To improve the methods of gathering and concentrating maple sap in order to increase the output of first grade sugar and sirup.

2. To standardize grades, packages and handling methods.

3. To provide machinery for the regular and uniform distribution of pure maple sap products to the consumers.

4. To widen the market and increase the demand for pure maple sap products.

It is interesting and instructive to note that during the past year, while the staple crops,—grain, potatoes, cattle and hogs, cotton and other crops of the same nature,—were being sold at prices which did not bring the farmers cost of production, three special products,—products usually classed as luxuries,—were sold at profitable prices. These were California oranges, California walnuts, and Massachusetts, Wisconsin and New Jersey cranberries. Every one of these crops might be classed as a luxury. Yet their producers have enjoyed one of the most profitable years in the history of the industries. Every one of them was marketed by strong, well-managed cooperative organizations. They were able to weather the storm successfully, while farm products which we consider necessities were being sold at a loss.

The orange growers of Florida and California market a crop sufficient on the average to give each family of five in the United States 1.7 bushels annually. The cranberry growers market a crop equal on the average to 2.8 quarts for each family of five. If all the maple sirup of number

one grade produced in the United States during an average year were marketed in the pure form there would be only approximately 0.6 of a pint for each family of five,—just a little over half a pint to divide among five people. It would not seem that there should be any danger of over production.

You have a product with a long standing reputation for quality. It can be put up in attractive packages, and properly handled it is practically non-perishable. It is a product which brings to the city dwellers something of the romance which dwells in the hills and forests of Vermont, and recalls to them tales of the hardy, adventurous pioneers who settled our New England States. There is no farm product that I know which can be made so attractive or which can be made to appeal so strongly to the consumer. The success of your organization, therefore, will depend upon the loyalty and energy of your support, and upon the wisdom and vision of its management.

George Porter of Alstead, N. H., spoke on "Marketing Direct through Parcel Post". He said: "There are many advantages to the farmer in this way of selling his product. First, he gets the highest possible price, by reaching the people who consume his syrup. Second, he has a constant and regular market, year after year, providing he makes a superior grade in thickness and flavor. Third, he advertises the one crop in which Vermont excels the world. In this way he is doing his individual bit to counteract the fraudulent practice of selling adulterated syrups as maple. For it is a fraud, even if permitted by law, to advertise as maple syrup a liquid refuse made of cane, sorghum, molasses, and other less wholesome juices with a dash of maple flavoring. These "mixers" are in the same class as the man who sold "Rabbit pie", a concoction compounded of rabbit and horse meat. There is the same sophistry in their excuses for justifying their business. When called to account for his concoction, the pie man claimed it was made on a fifty-fifty basis,—one rabbit and one horse. Is the purveyor of adulterated syrups honest when he justifies his conduct by claiming he is making a "poor man's" substitute? The poor man pays as much for this RELISH (?) as he could buy the genuine article direct from the maker. Manufacturers in Vermont received sixty cents a gallon for their pure syrup last year. Compare this price with what is charged in stores for the much advertised brands of liquids corrupted with the base admixtures. Where does this wide margin of profits go?

It goes to the profiteers. The word "profiteer" was not found in the English dictionary previous to 1911. In the old days they used to call a man who was looking for a hundred per cent margin on his turnover a "profiter"—a sort of baby "profiteer". It is only since a class has grown up who are not staggered by five hundred per cent that we've added the extra "e". It goes to the profiteer, who explains that he must play "safe" to justify his paying the farmer for his sweat and outlay one half it costs the farmer to make his syrup.

The fault is the farmer's for these conditions. The remedy lies in his hands. There are millions of people who are eager to buy his goods. All he has to do is to let them know when and where they can get them. This he could do by advertising in the papers and magazines these people read. If the individual farmer doesn't know how to go to work to do this let him combine with his neighbors and hire someone that does. The farmer's job is to standardize his product, ship exactly what is ordered, and aim to make the highest grade. Any letting down in quality, through negligence, in thickness, purity and flavor is fatal to his investment.

The advertising will cost him quite a per cent of his income from his crop for a year or two. At the end of this time he will be in an independent position, where satisfied customers will eagerly write him year after year to send them all he can make. I know, for they do.

Victor I. Spear of the Vermont Maple Sugar Market at Randolph was asked to address the meeting. He responded as follows:

"I don't know what phase of this subject the people here would like to have me talk about this morning, but my personal feeling in regard to maple goods of Vermont is something in line of what I expressed in the meeting last evening, that the great demand, the great problem for the sugarmakers of Vermont to handle at this time is to use greater care in the preparation of their product and get a larger percentage of it of a quality that those of us who handle it are not ashamed to send to our customers. Everything that Mr. McKay has said in regard to the small supply of maple goods as compared with the large number of customers that we have to send to, is true, and probably you could cut the product in two in the middle or more of what he has given as the production and you would get then more than the supply of firstclass goods that we have to

take care of this trade. I have always believed, and have perhaps done as much as any one person in Vermont, to try and standardize and improve the quality of the Vermont product. I don't know how successful I have been but I have worked along that line for the past twenty years, and have accomplished, I hope, something. We have been in the habit of thinking a pound of maple sugar was 16 ounces, no matter what the quality was, but I believe we are up against a proposition or condition at present that is quite different, and we have got to recognize it, and have got to use more care, and have got to put up a quality of goods that we can send to the customers in the proper form and have them appreciate it. That is the only message I have to give you this morning. I believe it is the one we need to take home with us and distribute among our neighbors and try to inspire the sugarmakers of the State of Vermont."

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CONSERVATION OF OUR MAPLE FORESTS.

BY W. G. HASTINGS.

CHIEF FORESTER, MONTPELIER, VT.

In discussing this subject with you I am mindful of the fact that I shall probably touch upon no point which is not already familiar to every owner of a sugar orchard; therefore, the things I say unto you are said in the spirit of review.

To my mind there are three inclusive meanings within the word "Conservation", no one of which taken alone is a proper definition of the word. These three meanings are Use, Care and Replacement, and no sugar orchard or forest holding of any kind, or any other natural resource for that matter, is being conserved unless it is being properly cared for, and also, if it is a resource which is capable of replacement, conservation likewise includes among the meanings of the word the replacement of this resource if economic conditions warrant the effort. It is axiomatic that these three meanings be taken jointly as the meaning of conservation when applied to our sugar orchards for Use without Care is mere vandalism, Care without Use is simply preservation, and Replacement without Care and Use is at best misguided philanthropy.

CONCERNING USE: It is seldom that the sugar orchard is located on soil so favorably adapted to tree growth that it can be used continuously during a long period of time without thoroughly undermining the vitality of the several trees. This is particularly true if the tapping bit is so large in diameter that the wound inflicted cannot heal quickly. Therefore, in the use of your sugar orchard you should either provide for a rotation, permitting the tree to rest for a decade or so after a period of ten years of tapping, or you should use a very small bit having a diameter not larger and preferably smaller than 7-16th of an inch, in order that the hole may heal quickly, through the healing power of the tree. If it is necessary to drain the orchard heavily it is better to use three or four spiles to the tree and tap with a smaller bit than to provide for the same amount of sap flow by using half as many spiles and a bit twice as great in diameter. Apparently the usual amount of sap taken from a tree does not greatly lessen the vigor and vitality. It is the dead wood caused by a large tap

hole that does the damage, and the rotation which I have suggested is to insure that each tap hole will puncture sap-giving wood to its full depth. Use your orchard to its fullest capacity, but do not misuse it.

CONCERNING CARE: Under this heading I have nothing to add to the information which is common knowledge to all of you. However, for the sake of emphasis I should like to re-state this common knowledge somewhat as follows:

(1). Cut out all evergreen growth in your sugar bush and do not pasture the area. Permit and encourage hardwood undergrowth to come up. This precaution should be taken for two specific reasons. First, it aids replacement; second, it will very materially reduce the insect damage which is likely to occur, since the adult insect, which in its larval stage does such great damage to the sugar orchards, does not like to flit about over brush covered areas. These moths prefer to fly a few feet above ground which is grass-covered and supports mature or nearly mature tree growth. Also, there are those among you who believe emphatically that the *quality* of sugar produced from an orchard which partakes of wood or forest conditions is higher in that delightful, elusive quality that has made maple products justly famous. This may not be so, but there are those among us who believe it.

(2.) Foster the Song birds for they are the enemies of insect life. I would go so far as to advocate during the sugar season the building of bird-houses and the providing of proper food to entice such birds to nest in your sugar orchards during the summer season.

(3). Remove all dead trees either standing or fallen from your orchard, and all seriously diseased trees as well. Pick up from the ground every branch and twig which has been whipped off by the wind. This gleaning process should be conducted immediately after the snow leaves the ground in the spring; all twigs and branches so gleaned should be burned at once, since they are a source from which future insect depredation may arise. Many of the so-called twig pruners spend the winter months embedded in these fallen branches.

(4). If the above control measures fail to keep insect life well in check and if your orchard is being seriously affected by the maple-borer I suggest that you apply the

popular kerosene emulsion to the boles of a few hundred of your choicest trees.

This application need not be carried to a greater height than fifteen feet, and seldom needs to extend below the customary tap height. The moth which is responsible for the work of the maple borer apparently does not like to lay it's eggs on bark which has been coated by this emulsion.

CONCERNING REPLACEMENT: We all of us realize that trees live and when their four score years and ten is over they die, and therefore if we do not permit them to replace themselves naturally, artificial replacement must be provided, or we are not fulfilling one of the tenets of conservation. Sugar orchards might profitably be established on abandoned pasture land providing the soil, slope and aspect is ideal by planting the trees in rows up and down the hill. The spacing in the rows should be rather close together, say a rod apart, while the rows should be two or three rods apart to permit of full crown development. Here again the area should not be pastured after the young trees have reached the age where fertile seed can fall and create forest conditions. Also, I should like to call to your attention the fact that our roadsides offer excellent opportunities for the establishment of a fair-sized sugar bush on nearly every farm, and if I give you no other thought to take home with you I should like to commend for your consideration the idea that a well shaded road needs less maintenance than does a road subject to the drying effects of sun and wind. I thoroughly believe that thousands of dollars are now spent in road maintenance each year which would not be necessary were our roadsides properly provided with shade.

WEDNESDAY EVENING SESSION.

Before taking up the marketing plan at the meeting held at the New Sherwood Hotel, the following program was carried out by the Sugarmakers:

"MARKETING", BRUCE CORLISS, St. Albans,

"LOCAL ORGANIZATION", C. F. MORAN, Jericho.

READING, MRS. M. J. CORLISS, Montpelier

"PACKING AND SHIPPING", H. M. HOSKINSON, Cuttingsville.

"RELATION OF THE DEALER TO THE PRODUCER", GEORGE C. CARY, St. Johnsbury.

Mr. Cary and other wholesale sugar dealers have offered to cooperate with the Sugar Makers with the use of their plants to get the sugar marketing exchange under way, and it is likely that their offers will be accepted while the exchange is getting on its feet.

Following this program it was voted to go ahead with the organization of a central marketing exchange, either along the lines proposed by A. W. McKay, or along similar lines. A committee composed of C. F. Purington of Burlington, C. F. Moran, president of the Association, and Arthur Packard, both of Jericho, was elected to appoint an organized committee of seven members who will have authority to complete plans for the marketing organization and proceed to put those plans into effect at an early date. No plan to be considered as accepted until it has been approved by an attorney who is, in turn, approved by Commissioner of Agriculture E. S. Brigham. When the plan is ready, the committee of seven will go about securing members of the marketing exchange at \$10 a share. Those who have already signed for their \$10 shares, of whom there are about thirty, will become charter members of the exchange. The payment of these memberships will enable the committee of seven to go about the work of organizing.

OUTLINE OF THE MARKETING PLAN.

As prepared by A. W. McKay, and now under consideration by the Vermont Maple Sugar Makers' Association :

The basis of the organization will be local associations made up of producers using the same shipping point, or residing in the same town, or in any geographical division which will make a compact unit. The purpose of the local association will be to act as a unit for the dissemination of market information among its members, information relative to methods of gathering and concentrating sap, and other matters of general interest. It will also act as an assembling and shipping unit, and the secretary or manager of the local association will store or ship the sirup of its members as directed by the manager of the central organization.

The local association will be incorporated with an authorized capital stock which should be fixed at not less than \$2,500. It will probably not be necessary to issue more than forty per cent of the authorized capital stock at the time the association is organized. The par value of the shares has been placed at \$10.00 and each member of the association must be a stock holder to the extent of at least one share. No member can hold more than ten per cent of the stock of the association and dividends are restricted to 6 per cent.

In the crop contract between the local association and its members each member agrees to loan to the association upon demand an amount equivalent to five cents for each spout driven the previous season upon the farm which he now occupies. In return for the loan, the association will issue certificates of indebtedness payable in five annual installments. This loan fund will be used by the local association to purchase the common stock of the central exchange.

The members of the local association—each of them being entitled to one vote, irrespective of the amount of stock which he owns—will elect their directors, who in turn will elect the officers of the association. The members of the local association will also elect directors to represent them upon the board of the central exchange.

The central organization, which for the purposes of this report is called the Vermont Maple Products Exchange, will be organized under that section of the Vermont law which makes provision for the incorporation of cooperative

associations. The common stock of the exchange will be owned by the local associations. The associations will control absolutely the policy of the Exchange, and are thereby assured that it will be operated for their benefit and the benefit of their members. Each director will hold the proxy of the association which he represents, and will be entitled to one vote in all meetings of the Exchange.

Inasmuch as the board of directors of the Exchange will be a rather large unwieldy body, it is considered advisable for the directors to elect from among their own members an executive committee, which will be charged with the supervision of the business of the Exchange. The executive committee will elect the officers of the Exchange and a manager, who will have direct charge of its proceeding and marketing activities.

The local associations will require a shipping shed, and a small amount of storage space. This in many cases can be leased for two months, or whatever period is required. If it is necessary to erect a building the cost may be in the neighborhood of \$1,000 and stock with a par value of \$10 per share, carrying a dividend restricted to 6 per cent will be sold to the members. The issue should be large enough to provide for the cost of the building, and care for the preliminary expenses of the local association.

It will then be necessary for each association to purchase its proportional amount of the common stock of the central exchange. This money can be raised by means of the revolving loan fund already mentioned, to which the members will subscribe a specified amount per spout, estimated at five cents. The loan fund can be paid either in cash, or in notes, but in case payment is made by note, the association has authority to deduct the full amount of the loan from the advances made to the member for syrup. This loan shall be made without interest, and repaid in five annual installments. Certificates of indebtedness will be issued by the association to the members, and each season a specified amount per gallon will be deducted from the sale of the syrup delivered by each member. To repay this loan certificates of indebtedness, payable in the same manner as the original loan, will be issued to cover the deductions.

The original loan fund will be used to purchase the common stock of the Central Exchange, which will be held in the name of the Association and will entitle the Association to one vote at meetings of the Central Exchange. On the basis of 100,000 gallons under contract, a loan of 5

cents per tree will provide for the purchase of the common stock of the Exchange, to the extent of \$20,000.00. This operating fund will be expended under the direction of the Board of Directors for advertising, preliminary expenses, and advances to members. Any expenditures made for advertising and for salaries and other expenses will, of course, be charged against the season's output, so that the capital investment will be unimpaired.

It will be necessary to advance the producers a percentage of the value of their maple products before these products can be processed and sold by the Exchange. It is assumed that the Exchange for the first one or two years of its operation will contract with an established manufacturer to process and can their pure syrup. This manufacturer can be bonded and act in the capacity of a warehouseman. Loans can be secured on warehouse receipts covering the syrup, and, if necessary, the cans and other packages can be stored in his building. These warehouse receipts can be tendered to the bank as collateral for loans sufficient to pay the advances due to the local association and their members. This money will be distributed to the local associations, which in turn will pay over to their members the amount due each. Advances made to members should be conservative, and not greater in any case than the loan value of the product.

Provision has been made in the Articles of Association whereby the Exchange may issue preferred stock with a dividend rate of seven per cent per annum. This provision has been made for the purpose of financing the construction or purchase of a central plant and of canning machinery, drums and other equipment. It is recommended however, that no investment be made in plant or equipment until the Exchange has operated successfully over a period of one or two years. The Exchange should provide facilities for processing its products by leasing a plant, or, if satisfactory arrangements can be made, by entering into a contract with a Vermont manufacturer to process, can and pack its products.

The operation of a processing plant is a specialized business, and it is inevitable that mistakes will be made while the management is gaining experience. The above recommendations are made in order that the producers may gain at least a part of the necessary experience before attempting operations on a large scale.

RESOLUTIONS.

The Vermont Maple Sugarmakers' Association at its 29th Annual Meeting thanks the Burlington Chamber of Commerce for its courtesies, the local press for excellent publicity, the hotels for reduced rates, and the University for the use of its plant.

We regret to learn in the morning paper the serious illness of our esteemed Governor, the Honorable James Hartness, to whom we had hoped to listen at the evening banquet, and we sincerely trust that he may rapidly recover his usual health and be spared for many years to come.

We hail with delight many things, among them:

The Disarmament Conference, which seems to be bringing the nations together.

The enactment by the present Congress—and largely through the influence of the so-called agricultural bloc—of several pieces of constructive legislation in the interests of agriculture, and consequently, through agriculture, of the nation as a whole notably, aid to the Federal Land Banks, the War Finance Relief measure, the Packer control bill, the grain exchange control bill, and the farm to market road law,—these representing more agricultural legislation than has ever before been passed at a single session of Congress.

The establishment of a really worthwhile tuberculosis policy in Vermont by virtue of legislation passed at the last session of the General Assembly, whereby it is now possible to do reasonably effective work.

The formation of a creamery managers and operatives association, which, if wisely managed, ought to prove a potent factor in the upbuilding of Vermont's dairy interests.

The getting together of the maple sugar makers in the establishment of a marketing exchange, which doubtless will not have smooth sailing, such things rarely do, but ought ultimately to work to the advantage of our farmers.

The maturing of the State Federation of Farm Bureau movement, which has now a local habitation and a permanent working force.

The rapid yet substantial forward movement of the several county farm bureaus.

The successful maner in which through the agency of the boys' and girls' club work literally thousands of boys and girls are becoming more vitally interested in and appreciative of life upon the farm.

The good work being done in the furtherance of bull associations and cow test associations the State over. And, finally, though the list is still incomplete the evidences on every hand that increasingly Vermont farmers are learning the meaning of the word "cooperation", and are evincing the fact by their deeds.

However, like Oliver Twist, we ask for more. While we realize that legislation is not a panacea for all our corporate ills, we believe that in several respects our interests and—since agriculture is a basic industry—the interests of State and Nation would be served by further legislation, more especially by the enactment of federal legislation looking towards:

Such tariff adjustments as will tend to equalize the cost of farm produce production in this and competing countries:

Such adjustment of taxation as will tend, so far as is practicable, toward the distribution rather than of the concentration of wealth:

Relief along credit lines:

The usage of warehouse receipts for commodity financing:

Such modification of laws as will clearly define the rights of farmers cooperatively to market their products:

The telling of the truth as to the fabric one buys:

The prohibition of the manufacture of or, if that be impracticable, the prohibition of interstate commerce in, or, if that is impracticable, at least the clear labelling of filled milk and the compulsory usage of a name which will obviously declare the thing, even to the casual reader, for what it is—this in the interests not only of the great dairy industry of the country but also of the health of little children.

Of course we are interested in the fight now being waged in behalf of New England dairymen by the officers of the New England Milk Producers' Association. May their decisions ever be wisely shaped and may their courage never fail.

We reiterate our last year's expression of faith in the worthwhileness of an advertising campaign in favor of the use of milk and milk products. We believe that the cow makes the very best home brew which can be made, that there is no kick in it—except as she kicks over the pail—and that, unlike the product of the still and the vat, her outpourings mean health and happiness for both producer and consumer.

Ernest Hitchcock was active in our councils for a long time. He was six years a member of the State Board of Agriculture; for some time a Cattle Commissioner; President of the Rutland County Farm Bureau; a Charter member of and for many years secretary and, later, president of the Vermont Forestry Association, and the first State Forester; and, withal, a good farmer, a good neighbor, a successful breeder of registered Holstein cattle. His given name befitted him. Earnest in all his work, he was a cogent thinker, a forceful speaker, a strong advocate, a constructive organizer, whose counsel we will miss.

We suggest to all sugarmakers that individually they establish separate retail and wholesale prices, that they do not sell, as so often is done, a gallon or two of syrup at the same price that they charge for a hundred gallons. The demoralizing effect of such a practice is so obvious that it would seem as if attention only need be called to it.

J. L. HILLS,
JOHN CANDON,
W. C. BUSH.

Committee on Resolutions.

SUGAR SCORING.

The results of the sugar scoring were as follows:

CLASS A.

LARGEST AND BEST DISPLAY OF MAPLE PRODUCTS:

First prize: H. M. Hoskison.....Cuttingsville

CLASS B.

MANUFACTURERS DISPLAY OF MAPLE PRODUCTS:

First prize: Mrs. Helen Dodd.....South Newbury

SPECIAL CLASS.

First prize: Mr. and Mrs. I. W. Kirk....South Wallingford

Second prize: A. W. Aldrich.....Springfield

Third prize: H. M. Hoskison.....Cuttingsville

CLASS C.

MAPLE SUGAR CAKES:

First prize: M. G. Lamson.....Montpelier

Second prize: A. W. Aldrich.....Springfield

Third prize: Mrs. C. A. Badger.....East Montpelier

Fourth prize: D. D. Howard.....Cambridge

Fifth prize: Holmes Moran.....East Fairfield

CLASS D.

BEST EXHIBIT OF MAPLE CREAM, NOT LESS THAN 5 PACKAGES:

First prize: M. G. Lamson.....Montpelier

Second prize: Mrs. C. A. Badger.....East Montpelier

Third prize: L. L. Story.....East Fairfield

CLASS E.

MAPLE SYRUP.

	Score
M. G. Lamson, Montpelier.....	99
H. M. Hoskinson, Cuttingsville.....	98.5
Mark Abott, West Danville.....	96
Mrs. C. A. Badger, East Montpelier.....	94.9

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A

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Atkins, C. H.....Westmore	Best, A. M.....Essex Center

B

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Bacon, Richard.....Chelsea	Bigelow, James T. Saxton's River
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Badger, E. J.....Marshfield	Bingham, L. W.....Middlebury
Badger, Jennie.....East Montpelier	Bisbee, John C.....Moretown
Badlam, G. E. L., 41 Central St., Rutland	Bisbee, R. D.....Moretown
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Bailey, W. E.....South Ryegate	Blanchard, F. W.....Ascutneyville
Baird, R. O.....Pittsford	Blanchard, I. C.....Cavendish
	Blondin, W. C.....Barnet
	Blood, F. T.....Woodstock
	Blood, L. S.....Hartland
	Bolster, Orin E.....East Dover
	Boreland, C. M.....West Glover

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Bradley, Thomas, 64 Prospect St., Burlington		Chamberlin, W. C....	South Ryegate
Brigham, E. S.....	St. Albans	Chamberlin, W. E.....	Randolph
Brigham, Fred.....	Norwich	Chandler, W. G. & Son, West Danville	
Brimblecombe, R. S....	Marshfield (R. D. 2)	Chapin, H. B.....	Middlesex
Brock, H. S.....	Montpelier	Chapin, J. A. & Son....	Middlesex
Brock, John B.....	West Newbury	Chapin, M. E.....	Middlesex
Bromley, Delos B.....	Danby	Chase, Perry.....	East Fairfield
Bromley, Duane P.....	Danby	Cheney, S. T. R., Mount Hermon, N. Y.	
Bromley, Hugh.....	Danby	Cherrie, George K.....	Newfane
Bromley, Kirk.....	Danby	Childs, M. R.....	Moretown
Bromley, Mrs. K. M.....	Danby	Church, F. A.....	Bellows Falls
Bromley, Mrs. Mamie.....	Danby	Church, W. E.....	Derby, (R. D. 1)
Bromley, Mrs. Martin.....	Danby	Clark, C. C.....	Bristol, (R.D. 3)
Bromley, Mrs. M. J.....	Danby	Clark, E. L.....	Glover
Bromley, M. J.....	Danby	Clark, Mrs. J. A. & Son, Brattleboro	
Bromley, Mott H.....	Danby	Clark, Roy G.....	Belmont
Bromley, Nancy F.....	Danby	Clark, Winslow.....	Shoreham
Bromley, R. N.....	Danby	Cleveland, C. S. H.....	Wolcott
Bromley & Holmes.....	Danby	Clifford, A. E., Starksboro, (R. F. D. 2)	
Bronson, Miss Jennie, East Hardwick		Cloud, J. H.....	Pompanoosuc
Brown, B. B.....	Danby	Cobb, Charles R.....	Woodstock
Brown, W. John, Middletown Springs		Cobb, George C.....	Rutland
Bruce, Frank.....	Warren	Coburn, Archie J.....	Underhill
Brunelle, Zephine.....	Chelsea	Coburn, Harry L....	East Montpelier
Buck, Myron.....	East Bethel	Colby & Strawn..	Orleans, (R. D. 1)
Buckley, W. A.....	North Clarendon	Cole, W. W.....	Enosburg Falls
Bugbee, E. J.....	Tunbridge	Collins, C. W.....	Strafford
Burbank, Henry.....	Chelsea	Collins, E. B.....	Hyde Park
Burbank, M.....	Orleans	Collins, M. L.....	Strafford
Burlington Evaporator Company, Burlington		Collins, W. H.....	Strafford
Brunette, R. E.....	Bethel	Colvin, C. H.....	Danby
Burnham, T. K.....	Bristol	Colvin, Mrs. C. H.....	Danby
Burton, E. S.....	Mount Holly	Colvin, John C.....	West Rutland
Butler, A. E.....	Moretown	Colvin, N. E.....	Danby
Buzzell, Thomas G....	Cuttingsville	Colvin, Nellie.....	Danby
		Cook, A. H....	Middletown Springs
		Cook, L. E.....	Cambridge
		Coolidge, O. J....	South Londonderry
		Coolidge, A. W.....	Bellows Falls
		Coolidge & Sessions..	Bellows Falls

Curtis, A. T.....St. Albans
Currier, Jed.....Fairfax
Cutting, Frank A.,
79 Summer St., Boston, Mass.

D

Daniels Brothers,
St. Johnsbury (R. D. 1)
Daniels, Sam.....Hardwick
Daniels, W. B.....Middlesex
Darling, E. A.....East Burke
Davis, G. A.Rutland
Davis, John P.....Chelsea
Davis, H. E.....Cambridge
Davis, Ray E.....St. Johnsbury
Davis, Smith G.....Montgomery
Davidson, L. E.....Springfield
Day, Edmund.....Newport
Day, L. S.....Irasburg
Dickerman, George.....Chelsea
Divoll, F. P.....Springfield
Dobias, John.....Colrain, Mass.
Dodd, David.....South Newbury
Dodd, Helen.....South Newbury
Dow, Horace N.....Middlebury
Dow, Ora.....Vershire
Dow, O. L.....Cabot
Drinkwater, Forrest.....Plainfield
Dumont, Henry.....Chelsea
Dunnett, G. H.....South Ryegate
Durant, J. H.....West Newbury
Dutton, E. E.....Orleans
Dutton, George L. South Royalton
Dutton, R. A.....Orleans
Dwinell, Earl G.....Plainfield

E

Eastman, A. L.....Groton
Eaton, C. H.....Rochester
Egan, John P.....Middlesex
Eldred, Elmer H.....Swanton
Elliot, George G.....Bristol
Ellsworth & Sons. Jeffersonville
Emery, Herbert E.....Plainfield
Emery, Nellie E.....Plainfield
English, L. W.....Woodstock
Erwin, W. S.....East Corinth

F

Farmer, B. W.....Island Pond
Farmer, F. A.....East Burke
Field, W. F.....Hardwick
Fields, H. B. & Son.....Milton
Findlay, Howard. North Craftsbury
Fish, Marshall B.....Rutland
Fisher, Hosea...West Brattleboro
Fitch, C. W.....Montpelier

Fitch, E. C.....East Calais
Fitzgerald Brothers....Underhill
Follett, O. W.....Townshend
Forbes, Charles.....Andover
Foster, C. D.....Cabot
Foster, E. M.....Waterbury
Foster, Col. H. S.....North Calais
Franklin County Pure Maple Sugar
and Syrup Company,
Enosburg Falls
Fuller, A. A.....Warren
Fuller, F. S. & Company,
Saxton's River
Fulton, George B.....Irasburg

G

Gardner, George C.....Springfield
Gates, Charles W. North Hartland
Gaylord, P. B.....Waitsfield
Geash, Howard.....Fairfax
George, F. A.....Williamstown
Giddings, D. E.....Bakersfield
Gilbert, H. H. & Sons. East Fairfield
Gilbert, W. B.....Woodstock
Gile, George B.....Jericho
Gilfillan, W. M. & Son,
South Ryegate
Gillian, A. W.....Cambridge
Gillen, James E.....Fairfax
Gillette, Edward A.,
White River Jct., (R. D. 1)
Giltman, Dean N.....Chelsea
Glover Calf Club, The
West Glover
Goddard, M. F...Waterloo, Canada
Going, G. A.....Orleans
Goldthwaite, A. P. Shelburne, Mass.
Goodrich, B. A.....Chelsea
Goodrich, Charles T.....Benson
Goodwin, Norman A...Montpelier
Gordon & Elliott.....Felchville
Goss, Charles W.....Barnet
Gould, J.....Danby
Gould, Mrs. J.....Danby
Grady, J. H.....Lyndon
Grant, E. E...East St. Johnsbury
Graveline, Edward.....Newport
Gray, E. A...St. Johnsbury Center
Green, M. T.....Pawlet
Green Mountain Stock Farm,
Randolph
Gregg, Leon E.,
Springfield, (R. D. 3)
Grimm, G. H., Estate.....Rutland
Grimm, John H...Montreal, Canada
Grimm, Nellie M.....Rutland
Gross, E. A.....Orleans, (R. D. 1)
Grout, H. L.....Perkinsville

Grout, Leon E.....East Jamaica Hooper, E. J.....East Fairfield
Gayette, H. A.....North Montpelier Hopkinson, George.....Derby

H

Haile, C. H.....Montgomery
Hall, A. R.....Derby
Hall, H. P.....Jericho
Hallett, E. H.....St. Johnsbury
Hammond, W. S.....Newport
Harding, John S.....Vernhire
Harrington, F. E.....Windham
Hart, Robert C.,
159 Nicholas Ave., Brooklyn, N. Y.
Hartley, Andrew.....West Barnet
Haskell, N. M. & Son.....Wilmington
Hastings, Mrs. E. G.....St. Johnsbury
Hatch, S. A.....West Danville
Hathorn, G. B.....Barnard
Hayes, Mrs. A. L.....Strafford
Hayes, F. W.....Strafford
Hayes, J.....Strafford
Hayes, J. R.....Strafford
Hayes, M. W.....Strafford
Hayes, R. W.....South Strafford
Hayford, W. E.....East Montpelier
Haynes, C. C.....Wilmington
Hazzard, G. M.....Charlotte, (R. D. 2)
Heald, E. I. & Son.....Proctorsville
Heald, Percy E.....Chester Depot
Heath, J. H.....Lyndonville
Hendricks, A. S.....Franklin
Hewes, K. F.....South Londonderry
Hewes, L. K. & Son,
South Londonderry
Hewitt, A. W.....Plainfield
Hewitt, Harvey J.....Bristol
Hewins, Henry W.....Thetford Center
Hicks, John.....West Newbury
Higgins, Dr. J. H.....Union Village
Hill, Arthur S.....Bristol (R. D. 1)
Hill & Clifford.....Starksboro
Hill, E. K.....Middlesex
Hills, Dean Joseph L.....Burlington
Hills, L. S.....Waterbury
Hiner, Alex C.....Fairfax
Hines Brothers.....Hardwick
Hinton, W. C.....East Charlestown
Hodgdon, A. M.....Cabot
Hogan, A. G.....Bristol (R. D. 1)
Holbrook, L. E.....Irasburg
Holbrook, P. H.....West Burke
Holden, Arthur M.,
North Clarendon
Holden, Ira L.....Northfield
Holden, Jerome.....Putney
Holden, John C.....North Clarendon
Holden, W. W.....Northfield
Holman, Ray.....Randolph

Horton, G. B.....Ladlow
Hoskison, H. M.....Cuttingsville
Howard, D. D.....Fairfax
Howard, Dana L.....West Brattleboro
Howard, E. T.....West Hartford
Howe, Elmer.....Tunbridge
Howe, Will W.....Tunbridge
Hoxie, Benjamin J.....Proctorsville
Hoyt, R. M.....Cabot
Hubbell, M. L.....Enosburg Falls
Hunt, A. J.....Westfield
Hunt, Rolle E.,
Richmond Hills, Long Island, N. Y.
Hunter, Joseph N.,
East Burke, (R. D. 1)
Huntoon, Phillip J.....Charlestown
Hutchins, F. B.....Northfield
Hutchins, Walter D.,
North Woodstock, N. H.

J

Jackson, O. H.....Westford
Jenne, A. M.....Richford
Jennison, William.....Pawlet
Jewell, Frank G.....Corinth
Johnson, I. P.....Craftsbury
Johnson, Jason.....Plainfield
Jones, C. H.....Burlington
Jones, E. H.....Waitsfield
Jones, G. M.....Waitsfield
Jones, N. M.....Richford
Jones, W. A.....Randolph
Joslin, E. J.....Newport

K

Keeler, Harold C.....Hyde Park
Kelley, C. B.....Derby
Kelley, E. S.....Orleans, (R. D. 3)
Kennett, Charles L.,
East Hardwick (R. D. 2)
Kew, C. H.....Waitsfield
Kimball, C. H.....Danville
King, Denis M.....Fairfax
King, T. A.....Fairfax
Kinney, F. H.....Springfield
Kinsley, O. A.....East Fairfield
Kirk, Irvin V.....South Wallingford
Kitching, Robert P.....Orleans
Knapp, E. E.....Townshend
Kneeland, Dorie A.....Waitsfield

L

Lackey, E. A.....Jamaica
Lackey, J. E. and J. A.....Derby

Ladd, N. P.....Richford	Martin, E. J.....Montgomery
Ladeau, George.....Fairfield	Martin, L. F.....Manchester
Ladue, Mrs. G. A.....Jeffersonville	Martin, Murray A.....Plainfield
Laird, G. A.....Cabot	Martin, O. L.....Plainfield
Lamphere, Asa.....West Rutland	Martin, R. J.....Rochester
Lamson, M. G.....Montpelier	Martin, William E.....Norwich
Lane, C. H.....Middlebury	Martin, W. S.....Plainfield
Landreville, Eugene.....Perkinsville	Martin, William S. & Sons, Rochester
Larkin, Frank.....Tunbridge	Mason, L. E.....Barton
Lathrope, E. W.....Vershire	Mather, G. E.....Readsboro
Lawrence, E. D.....East Fairfield	Matthews, Andrew C., 21 Watkins St., Rutland
Lawson, Mrs. Sadie, Montpelier, (R. D. 1)	Maxfield, E. C.....Newport
Leader Evaporator Co., The Burlington	Maxham, A. E.....Waitsfield
Learnard, Z. A.....West Halifax	Maxham, M. C.....Worcester
Leonard, T. A.....Proctorsville	Maxim, E. A.....Middlesex
Lewis, R. C.....Woodstock	May, Fred.....Wilmington
Lewis, R. M.....Woodstock	May, Fred H.....Thetford Center
Libby, F. J.....Newport	May, J. H.....Burlington
Libby, Frank.....Chelsea	McDonald, W. I. B. Granby, Quebec
Lilley, Carl D. F.....Plainfield	McIntosh, L. D.....South Royalton
Lilley, J. O.....Plainfield	McKay, A. W., Washington, D. C.
Lomberg, F. W.....Arlington	McKnight, George C., East Montpelier
Leonberg, Albert M.....Putney	McMahon, J. D., Fairfax, (R. D. 1)
Loeland, M. G., 139 Church St., Burlington	McMahon, Miles & Son.....Stowe
Ludenn, Mrs. George, St. Albans, (R. D. 4)	McWayne, William P.....Dorset
Luller, W. B.....Vershire	Merrifield, A. M.....Williamsville
Luxford, Leo L., Newport Center	Merrifield, S. A.....Williamsville
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Lyman, J. A.....Hartland	Merrill, John H.....Roxbury
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	Mgr. Grove Hill Farm, Thetford Center
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	Miller, R. I.....West Brattleboro
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Marcette, Zoa.....Bakersfield	Muller, H. A. E.....Brattleboro
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Marony, R. H.....Rutland	Myott, John.....Montgomery
Marsden, George L.....Northfield	
Marsh, George F.....Chester Depot	
Marshall, H. C.....Belmont	N
Martin, Andrew, Elmore Hotel, Rutland	Naramore, H. D.....Orwell
Martin, Arthur I.....Rochester	Neill, B. E.....Warren
Martin, C. E.....Rochester	Nelson, G. E.....Barre
Martin, E. C.....Milton	Nelson, George M.....East Barret

Newell, Bernard W.,
West Wardsboro
Newell, E. D.....West Wardsboro
Newell, Mrs. E. D.,
West Wardsboro
Nichols, G. L.....Enosburg Falls
Niles, Allen P.....Derby
Northrop, Frank.....Ludlow
Northrop, P. B. B.....Sheldon
Nye, George W.....St. Albans

O

Orr, Don.....Vernshire
Orr, William J.....East Ryegate
Orvis, C. M.....Bristol, (R. D. 3)
Osgood, L. K.....Rutland
Osgood, O. D.....Marshfield, (R. D. 2)
Owen, M. J.....Barton

P

Page, R. G.....East Corinth
Page, W. B.....Springfield
Palaske, S. A.....Stowe
Palmer, Leon E.....Westfield
Park, O. H.....West Burke
Parker, C. A.....Irasburg
Parker, Fred F.....East Wallingford
Patch, C. D. & Son.....Hartland
Patterson, F. L.....Newport
Peabody, Amos.....Marshfield
Peace, C. H.....Marlboro
Pearl, Edwin S.....Vernshire
Pease, Edward E.....Weston
Peavy, I. L.....Morgan
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Peck, O. E. & L. E.....Westminster
Perley, E. E.....Richford
Perry, Clarence E.....Coventry
Perry, Dolphus.....East Fairfield
Perry, E. B. & Son.....Ira
Perkins, J. D.....Johnson
Phillips, R. D.....Townsend
Pike, Mrs. J. B.....Marshfield
Pike, S. C.....Montpelier, (R. D. 4)
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Pitkin, E. W.....Plainfield
Plastridge, Wallace A.....Northfield
Plumley, Elmer.....Cuttingsville
Poquette, Mrs. Joseph L.,
St. Albans

Powell, G. D.....Mount Holly
Powers, Charles A.....Pittsford
Pratt, F. S.....Montgomery
Pratt, H. L.....Cuttingsville
Priest, S. J.....Belmont
Prindle, Guy M.....St. Albans
Prindle, Leon D.....Charlotte

Prindle, MartinSt. Albans
Prouty, H. C.....Green River
Purington, C. F.....Burlington
Putnam, Fred A.,
Springfield, (R. D. 3)
Putnam, Leon L.,
Springfield, (R. D. 3)

R

Raney, FrankConcord
Ransome, H. E. & Son...Chelsea
Rawson, Noble H.....Windham
Read, ArthurCabot
Remick, H. E.,
St. Johnsbury, (R. D. 1)
Rice, A. M.....Jefferson
Richards, John.....Bethel
Richardson, H. B.....Union Village
Ridlon, John E.....East Wallingford
Riford, H. P.....Proctorsville
Roberts, J. W.....St. Johnsbury
Roberts, M. B.....Rupert
Roberts, R. H.....Chelsea
Robinson, D. F.....Pawlet
Robinson, Frank F.....West Danville
Roddy, C. S.....Fairfax, (R. D. 1)
Rogers, B. O.....West Newbury
Rogers, C. L.....Newport Center
Rollins, Nathaniel & Sons,
Middlesex
Rounds, Dora M.,
Starksboro, (R. D. 1)
Rounds, W. D.....Wilmington
Rowe, E. L.....Barnet
Roy, Henry G.....West Barnet
Rugg, F. L.....Putney
Rumney, G. H.....Montpelier
Russell, C. E.....East Middlebury
Russell, Frank L.....Cuttingsville
Russell, Thomas G.....Cuttingsville
Ryan, Earl M.....Cambridge
Ryan, T. F.....Fairfax, (R. D. 1)

S

Salmon, N. K. and Arthur...Glover
Sanders, B. E.....Barre
Sargent, P. D.....Chelsea
Sawyer, A. E.....Whiting
Saxby, E. H.....Marshfield
Schayltz, L. Jos.....Eden
Schillhammer, C. R.....Jericho
Scribner, H. F.....Plainfield
Scott, C. G.....Newport
Shattuck, D. A. & Son...Londonderry
Shattuck, Homer C.....St. Johnsbury
Shattuck, H. W.....Eden
Shattuck, R. L.....Eden

Shedd, E. M.....Fairfax
 Shepard, W. F.....Barre
 Sherburne, B. R...Glover (R. D. 1)
 Shine, Edwin W.,
 South Londonderry
 Shoreham, E. M.....Fairfax
 Simonds, E. C.....Peru
 Simpson, A.....Perkinsville
 Simpson, W. Arthur...Lyndonville
 Sleeper, J. S.....Vershire
 Slocum, Clarence A.....Brandon
 Small Bros. Mfg. Co.....Richford
 Small, F. H.....Huntington
 Smith, A. J.....Barton
 Smith, Allen.....Cabot
 Smith, Alson.....Plainfield
 Smith, Alvin H.....Danby
 Smith, Clarence F.....Peru
 Smith, G. H.....North Clarendon
 Smith, J. H.....West Bolton
 Smith, M. M.....South Londonderry
 Soloman, Charles I. Ashland, Mass.
 Soule, George H.....Fairfield
 Spaulding R. A.,

West Charlestown
 Spaulding, Willis L.,

Proctorsville
 Spear, Charles L...West Newbury
 Spear, E. F.....Chelsea
 Spear, F. F.....West Newbury
 Spear, J. P.....West Newbury
 Spear, Mrs. J. P...West Newbury
 Spear, Mrs. R. N...West Newbury
 Spear, V. I.....Randolph
 Sprague, George K.,

Randolph Center
 Squires, H. C. & Son....Newport
 Stearns, Collins.....Perkinsville
 Steavens, Mark....Cambridge Jct.
 Steavens, S. J.....West Newbury
 Stebbins, E. W.....Cambridge
 Stewart, Floyd E.....Eden Mills
 Stiles, R. G.....West Glover
 Stoddard, Price A.....Andover
 Stone, Mason S.....Montpelier
 Stone, O. B.....Eden Mills
 Stone, W. C.....East Wallingford
 Storey, G. E.....Burlington
 Story & Hicks.....Essex Jct.
 Story, L. L.....East Fairfield
 Strawn, N. W.....Orleans
 Strong, Fred W.....Montpelier
 Strong, S. H.....Moretown
 Swan, P. B.....Montgomery
 Swanton, F. V...Orleans (R. D. 1)
 Sweet, D. W.,
 Phillips, Maine, (R. D. 2)

Sweeton, A. W.....Brattleboro
 Sykes, Aurelius.....Hinesburg

T

Tabor, H. S.....Montpelier
 Taft, C. E.....Brattleboro
 Taft, John.....Brattleboro
 Taner, H. E.....Marshfield
 Taylor, Charles W.....Concord
 Teer, Frank.....West Rutland
 Tenney, E. C., Mgr. Scott Farm,
 Brattleboro
 Thomas, R. B.....Guilford
 Thompson, J. Edward...Landgrove
 Thompson, J. F.....East Corinth
 Thorburn, Andrew.....Norwich
 Thurber, N. E.....West Halifax
 Tietz, William.....Richmond
 Tiffany, G. V.....E. Berkshire
 Tift, Edgar F.....Dorset
 Tillotson, B. O.....Bakersfield
 Tracy, O. D.....Chelsea
 True, W. W.....Newport
 Truesdall, Clarence...Townshend
 Tuller, Fred V.....Tunbridge
 Turner, T. A.....Weston
 Tutherly, George C.....Chelsea
 Tuxbury, W. H.....West Newbury

V

Vall, Homer W.....Randolph
 Vermont Farm Machine Company
 Bellows Falls

W

Wade, A. P.....Moretown
 Waite, A. H.....Morrisville
 Walbridge, Earl M....Marshfield
 Walbridge, E. P.....Cabot
 Walbridge, Mrs. E. P.....Cabot
 Walbridge, F. M.....Cabot
 Walbridge, Maurice.....Cabot
 Walbridge, R. B. & E. O.....Cabot
 Walker, B. J.....West Rutland
 Walker, H. J.....Weston
 Walker, Lewis M.....Weston
 Walker, Warren.....Montpelier
 Walker, W. C.....Cabot
 Walter, E. N.....East Haven
 Warner, G. F.....Chester Depot
 Warren Brothers....Proctorsville
 Washington County Farm Bureau
 Montpelier
 Waterhouse, C. E.....Craftsbury
 Watson, Charles.....Derby
 Weed, B. W.....St. Albans
 Weeks, A. B.....Stowe
 Wells, Leon.....Bakersfield
 Wells, R. M.....Orleans

West, Charles E., North Troy, (R. D. 2)	Wilkins, Glenn A.....Morrisville
West, Ernest H.....Dorset	Williams, B. J.....Williamstown
Wetherby, E. G.....Danby	Williams, B. J. & Son, Morgan Center
Wetherby, Omar M.....Danby	Williams, E. J. & Son, Lower Waterford
Wheaton, Charles.....Passumpsic	Winn, S. E.....West Chesterfield
Wheeler, A.H.....Cabot	Wood, George M.....Waterbury
Wheeler, Clarence.....Cabot	Woodruff, W. S. & Son..Cambridge
Wheelock, C. H.....Bakersfield	Wright, Arthur..Bradford, (R. D. 2)
Whitcher, J. B.....Groton	Wright, Carlos & Son....Bradford
White, Enos R.....West Rutland	Wright, W. J...Montgomery Center
Whitehill, E. M.....Derby	Wyman, Ned W.....Cambridge
Whitehill, Nelson.....Peacham	
Whitney, Ernest L....East Dorset	
Wilber, Frank.....Rochester	
Wilber, Seth.....Moretown	
Wilbur, B. L.....North Montpelier	
Wilcox, F. H.....East Brookfield	
Wilder, L. O.....Middlesex	
Wildon, S. C.....Chelsea	
Wilkins, A. R.....Fairfax	
	Y
	York, William E..Bristol, (R. D. 4)
	Young, J.....Orleans, (R. D. 4)
	Younge, E. M.....Chelsea
	Younge, Harry A....West Danville

